INDEX TO VOLUME 68

JULY—DECEMBER, 1913

GENERAL INDEX

A

- Accidents:
  - Bridge failure due to heavy motor truck, South Royalton, Vt., 535
  - Grandstand failures, 535
  - Horse down a thirty-inch manhole, Rochester, N. Y., 327
  - Power plant, Ogden, Utah, 535
  - Railway:
    - New York, New Haven & Hartford, at North Haven, Conn., 253, 309, 365
    - Pennsylvania R.R., Tyrone, Pa., Divided responsibility, 225
- Accountant and the engineer, 709
- Advertising, Billboard, Disfigurement by, 225
- Aeronautical laboratory, Proposed national. By Dr. A. F. Zahm, 255
- Aeroplane for patrolling electric transmission lines, Great Western Power Co., San Francisco, 663
- Airships in Germany, the Zeppelin fleet, *245
- Albany, N. Y., Water purification costs, 70
- Albany, Oregon, Water purification plant, "Tuning up" filters and training attendants, 553
- Algiers port, Extension, 316
- American Concrete Institute, Establishment of monthly journal, 679
- American Engineering Association, Proposed. By William McClellan, 29
- American Highway Association, Convention, Detroit:
  - Consolidation with Road Builders' Association suggested, 680
  - Plans for the Congress, 254, 377, 405
  - Resolutions adopted, 401; Comment, 393
  - Success of, 393
- American Institute of Consulting Engineers, Plea for appointment of technical men to administrative positions, 585, 694
- American Public Health Association, Convention, 293
- American Road Builders' Association Convention, Philadelphia:
  - Consolidation of highway conventions proposed, 680
  - Papers presented, 672, 700
- American Society of Civil Engineers:
  - New Orleans meeting, 449
  - Rules governing presentation of papers, 78, 115
- American Society for Testing Materials:
  - Annual meeting, Success of, 2
  - Autoclave test for cement. By H. J. Force, R. J. Wig, L. R. Ferguson and H. S. Spackman, 13
  - Report on the waterproofing of concrete, 39; Comment, 29
- American Waterworks Association, Sectionalizing of, 2
- Antelope Valley siphon, Los Angeles aqueduct. Four-mile concrete and steel pipe riveted under bonus system. By W. H. Hurlbut, *60
- Appraisal of garbage plants. (See Refuse disposal, Chicago)
- Appraisal of railway property. (See Railways, Valuation)
- Appraisal of waterworks, Chillicothe, Ohio, 358
- Aqueducts:
  - Catskill:
    - Bronzes and brasses, Cracking of. Experiences, causes and prevention of trouble. By A. D. Flinn, 527; E. B. Rosa, W. P. Smith, 528; Comment, 508
    - Concrete-block casting, Record output at Kensico dam, 503
    - Cover for shaft, Removable cast-steel high-pressure, *413

- Aqueducts:
  - Catskill: (Continued)
    - Narrows siphon. Flexible-joint submarine pipe line, 36 inches in diameter and 10,000 feet long. By A. D. Flinn, *317; Comment, 309
    - New York City tunnel and conduits. By W. E. Spear, 333
    - Progress of work, 563
    - Sarles tunnel, Concreting, *428
  - Los Angeles:
    - Antelope Valley siphon of concrete and steel riveted under the bonus system. By W. W. Hurlbut, *60
    - Completion. Details of financing, general construction, costs and wages. By W. W. Hurlbut, *482; 563
    - Jawbone siphon, Designing, for minimum weight of metal consistent with safety. By E. R. Bowen, *682
    - List of articles published in Engineering Record, 1906-1913, 486
    - San Francisquito power station:
      - Butterfly gates, *327
      - General description, *218; Comment, 197
      - Surge tank, *299; Comment, 281; By R. D. Johnston, c420, c733. Correction, 644; W. F. Durand, c733
- Arbitration bill, Newlands, 85
- Arbitration Board, National, Amending the Erdman Act, 29
- Arches:
  - Brick arch. A question of stability. By J. H. Gandolfo, c*223
  - Groined arch:
    - Baltimore water filtration plant, Failure of arches. By J. W. Armstrong, *538; Comment, 479
    - Data relating to arches built in the United States and Canada, 539
    - Growing carelessness in construction. Need for more careful consideration of conditions of stability, 622
- Architecture:
  - Iron age of, 623
  - Requirements and engineering standards in building construction, 114. By H. G. Balcom, c166
- Arrowrock dam. (See Dams, Boise project)
- Ash-handling plant, Pneumatic, Chicago, 416
- Asia Minor, Plane-table survey in. Experiences in mountain work with sidelights on the people and the country. By L. T. Emory, *437
- Asphalt paving. (See Roads and pavements)
- Association of American Portland Cement Manufacturers, Autoclave test for cement. By A. S. Cushman, 14
- Astoria tunnel of the Consolidated Gas Co., New York City, Completion, *95
- Atlantic coast canals recommended by the War Department, 217
- Autoclave test. (See Cement)
- Automobile fees in Massachusetts, 581
- Automobile for flushing and sprinkling streets, Chicago, *602

B

- Backwater problems, Friction head in. By I. P. Church, c*168
- Bacteria removal from water. (See Water purification)
- Bahia, Brazil, New port of, 105
- Baltimore, Md.:
  - Pavements, Brick. By R. K. Compton, 436

- Baltimore, Md.: (Continued)
  - Water filtration plant, Failure of groined arches. Report by John H. Gregory. By J. W. Armstrong, *538
- Bamberton, B. C., Cement manufacturing plant, *123
- Bamboo, Strength tests of. By P. S. Bond, 582
- Bank protection. (See Embankments)
- Beams and columns:
  - Determination of moments in continuous. By W. A. Slater, *70
  - Formulæ. By Ernest Owen, c676
  - Formulæ, Comparison of 27. By E. L. Lasier, 41
  - Strength of outstanding flanges. By R. J. Roark, *722
- Beluah levee crevasse in lower Mississippi River valley, Closure of, with water flowing through. History of former breaks and construction methods. By A. L. Dabney, *4; Correction, 153
- Bench mark, Frost-proof, Winnipeg, Canada, *646
- Binghamton, N. Y., Fire, and loss of forty lives, 113, 250. By S. G. Koon, c336
- Bins, Storage, for lime at water purification plant, Columbus, Ohio. By C. P. Hoover and C. J. Clarke, *10
- Bituminous material. (See Roads and pavements.)
- Black River canal, Report on surveys and estimates By L. A. Burns, *157
- Blast, 100,000 tons dislodged by. By S. R. Hall, c506
- Boiler feed-water filter, Omaha Electric Light & Power Co., *546
- Boise, Idaho, irrigation project:
  - Construction camp at Arrowrock dam. By A. B. Mayhew, *116
  - Construction of Arrowrock dam. Concrete mixing and handling. By M. G. Doll, *265
  - Rolling dam construction. By C. H. Paul, *125
- Bombay reclamation project, 140
- Bond issues, Life of, 253
- Bonus systems. (See Contracts and contracting.)
- Book notes:
  - Air Compression and Transmission. By H. J. Thorkelson, 83
  - American Railroad Economics. By A. M. Sakolski, 560
  - American Society for Testing Materials, Proceedings, 648
  - Automatische Registrierwagen (Automatically Registering Scales). By O. Sauchritz, 83
  - Bau der Wolkenkratzer. By Otto Rappold, 55
  - Bridges, Design of Simple Steel. By P. O. G. Usborne, 55
  - Bridges, Treatise on Wooden Trestle. By W. C. Foster, 306
  - Builders' Quantities. By W. E. Ballard, 363
  - Building Arbitration. By G. A. Wright, 531
  - Bureau of Standards Circular, 704
  - Calculus. By W. S. Franklin, Barry MacNutt and R. L. Charles, 445
  - Catskill Water Supply of New York City. By Lazarus White, 83
  - Coast Erosion and Protection. By E. R. Matthews, 391
  - Concrete Roads and Pavements. By E. S. Hansen, 307
  - Conservation of Water. By Walter McCulloh, 504
  - Cranes and Hoists. By Herman Wilda, 560

- Book notes: (Continued)
  - Descriptive Geometry. By H. W. Miller, 83
  - Diagram for Beam Problems. By H. R. Thayer, 618
  - Efficiency Society, Transactions, 55
  - Eisenbau, Der. By Luigi Vianello, 504
  - Engineer, Status and Professional Relations of, 475
  - Engineering Thermodynamics. By C. E. Lucke, 391
  - European Cities at Work. By F. D. Howe, 25
  - Excavating Machinery. By A. B. McDaniel, 531
  - Factory Lighting. By C. E. Clewell, 306
  - Field Engineers' Handbook. By G. C. Wells and A. S. Clay, 445
  - Floors, Joists and Beams, Simplified Formulas and Tables. By N. C. Ricker, 704
  - Foreign Weights, Measures and Moneys, 648
  - Gas and Fuel Analysis. By A. H. White, 475
  - Gas and Gas Service, Standard Regulations for Manufacture, 531
  - Grain Elevators, Plans for, 363
  - Heating and Ventilating Engineers, Handbook for. By J. D. Hoffman and B. F. Raber, 648
  - Hendricks' Commercial Register, 223
  - Industrial Organization, Experiments in. By Edward Cadbury, 391
  - Industrial Organizations, Principles of. By D. S. Kimball, 560
  - Interlocking, Electric, 110
  - International Association for Testing Materials, Proceedings, 648
  - Irrigation. By Sir Hanbury Brown, 363
  - Irrigation Engineering, Principles of. By F. H. Newell and D. W. Murphy, 532; Correction, 618
  - Irrigation Water Measurement. By F. H. Newell, 25
  - Magneto and Electric Ignition. By W. Hibbert, 25
  - Manual for Engineers. By O. E. Ferris, 140
  - Mechanical Drafting. By H. W. Miller, 83
  - Mechanics for Builders. By E. L. Bates and Frederick Charlesworth, 732
  - Mine Surveying. By E. B. Durham, 560
  - Minimum Wage and Syndicalism. By James Boyle, 588
  - National Electric Code, 363
  - Natural Rock Asphalt and Bitumens. Arthur Danby, 588
  - New York Highway News, 475
  - New York Society of Architects, 251
  - Ohio Valley Flood of 1913. By A. H. Horton and H. J. Jackson, 475
  - Overhead Electric Power Transmission. By Alfred Still, 475
  - Panama Canal. By R. E. Bakenhus, 223
  - Panama Gateway. By J. D. Bishop, 392
  - Plastering, Standard Specifications for Exterior, 504
  - Plate Girders, Design of. By L. E. Moore, 618
  - Pocket Companion for Engineers, Architects and Builders, 732
  - Power Plant Testing. By J. A. Moyer, 532
  - Pumping and Hydraulic Machinery, Modern. By Edward Butler, 445
  - Pure Iron versus Copper Bearing Steel. By A. S. Cushman, 445
  - Railway Spiral, Practical. By L. C. Jordan, 445

*Illustrated articles; c, correspondence.

259704

Book notes: (Continued)
  Rainfall, Reservoirs, and Water Supply. By Sir A. R. Binnie, 140
  Reinforced-Concrete Bridges. By Frederick Rings, 532
  Reinforced-Concrete Construction. By G. A. Hool, 704
  Reinforced Concrete Wall Footings and Column Footings. By A. N. Talbot, 83
  Resuscitation. By C. A. Lauffer, 55
  Rivers, Improvement of. By V. F. Thomas and D. A. Watt, 110
  Robert Fulton. By H. W. Dickinson, 391
  Rolling Mill Industry. By F. H. Kindl, 445
  Rules of Management. By William Lodge, 391
  Safety First. By George Bradshaw, 445
  San Francisco Relief Survey, 25
  Schiffsturbinen. By G. Bauer and E. Ludwig, 83
  Scientific American Reference Book. By A. A. Hopkins and A. R. Bond, 648
  Smoke and Smoke Prevention, Bibliography of. By E. H. McClelland, 250
  Specifications and Tables for Steel-Framed Structures, 445
  Steam: Its Generation and Use, 475
  Steam Power Plant Engineering. By G. F. Gebhardt, 306
  Strength of I-Beams in Flexure. By H. F. Moore, 648
  Structural Design. By H. R. Thayer, 363
  Temperature Range in Concrete Arch Bridges, Determination of Internal. By C. S. Nichols, 140
  Testing Materials, Laboratory Manual of. By W. K. Hatt, 587
  Tests at the Watertown Arsenal, 223
  Theory and Design of Structures. By E. S. Andrews, 588
  Time, Longitude, Latitude and Azimuth, Determination of. By William Bowie, 25
  Trade Waste Waters. By H. M. Wilson and H. T. Calvert, 306
  Transformer Practice. By W. T. Taylor, 475
  Treating Railroad Ties. By W. F. Goltra, 250
  Turbine, Hydraulic. By R. L. Dougherty, 475
  Underground Waters for Commercial Purposes. By F. L. Rector, 504
  Vereines Deutscher Ingenieure, Die Zeitschrift des, 55
  Warmwasserheizugen Die Berechnung der. By H. Recknagel, 83
  Wasserkrafte. By Adolf Ludin, 56
  Water: Its Purification and Use in the Industries. By W. W. Christie, 588
  Water Bacteriology, Elements of. By S. G. Prescott and C. E. A. Winslow, 532
  Water Purification, 25
  Water Purification and Sewage Disposal. By J. Tillmans, 504
  Waterwheel, Theory and Test of an Overshot. By C. R. Weidner, 306
  Welding, Electric, List of Works Relating to, 110
  Year Book of American Society for Testing Materials, 475
Book selling and title-page honesty, 621
Boston, Mass.:
  Appropriation for gas lighting, City not forced to spend, 1
  Bridge, Chelsea-Charlestown, Mystic River:
    Drawspan, Temporary turntable, *122
    Pivot pier, *138
  Excavation costs, 76
  Pier, Commonwealth 5. Pile foundations and steel shed, *275
  School buildings, Unit costs of, 386
  Water consumption, 92
Brasses and bronzes. (See Copper alloys.)
Brick paving. (See Roads and pavements.)
Bridge abutments:
  Louisville & Nashville Ry., Reinforced concrete, *129
Bridge abutments: (Continued)
  Montclair, N. J., Bloomfield Avenue. Unusual design. Hollow, reinforced concrete, triangular boxes, *636
Bridge building. Temporary structures for supporting railroad tracks. Rules of the American Railway Bridge and Building Association, 490
Bridge design:
  Concrete bridges. Plea for arches of two ribs and for the three-hinged arch, 366
  Concrete slab spans, Pennsylvania R. R. bridges, Baltimore & Washington division, over Bush and Gunpowder rivers, 400; Comment, 393. By Edward Godfrey, c533
  Discussion of, with special reference to Quebec Bridge. By Ralph Modjeski, *321, insert, *354, *383; Comment, 309
  Short-span bridges, 143.
Bridge erection:
  Bendsburg, Germany, across Kaiser Wilhelm Canal, *577
  Derrick car for erecting 110-foot plate girders, Pennsylvania R. R., *269.
  Hampden R. R., Erecting 85-foot plate-girder spans with a ginpole, *106
  Newark Bay, N. J., Pennsylvania and Lehigh Valley Railroads. Rebuilding 3500 feet of trestle in twelve days, 69
Bridge failures due to heavy motor trucks, 535
Bridge floors:
  Fire dangers:
    Kansas City, 197
    Portland, Ore. By J. W. Cunningham, *c224, c307; Comment, 197
    Tacoma, Wash., 253
  Forth bridge, Renewing floor, 636
  Hollow concrete-tile, Spokane, Wash., Reduces dead load on bridge, *647. By J. W. Strack, c733
  Pittsburgh, in grade-crossing work at Second Avenue and Try Street, *32
  Specifications by United States Office of Public Roads, 231
Bridge loads:
  Investigations of stresses produced by train crossing truss and girder spans at Washington University. By E. O. Sweetser, 663
  Tests and experiments on highway bridges under moving loads. By F. O. Dufour, 165
Bridge piers. (See Piers, Bridge)
Bridge repairs, Uhrichsville, Ohio. By Edward Stingel, *53
Bridge specifications:
  Concrete substructures, Specifications of the United States Office of Public Roads, 305
  Home-made, c167
  Illinois Highway Commission, for concrete and steel highway bridges, 335
  Steel superstructures, Standards for fabrication of, suggested by the United States Office of Public Roads as a guide to local road officials, 230; Comment, 255; By L. W. Page, c392
Bridges, trestles and viaducts:
  Bascule, Largest, Chicago, over Calumet River, Baltimore & Ohio R.R., *697
  Bendsburg, Germany, across Kaiser Wilhelm Canal, Erection details, *577
  Boston, Chelsea-Charlestown, Mystic River:
    Drawspan, Temporary turntable, *122
    Pivot Pier, *138
  Buffalo, N. Y., Weight and cost of different types of bridges based on contract prices, *640
  Bush River. (See below, Pennsylvania R. R.)
  Cantilever, World's greatest, Insert *321
  Cedar River, Chicago, Rock Island & Pacific Ry., Moscow, Ia. Remodeling old substructure and erecting new plate girder spans by derrick cars and jigger beams, *183
Bridges, trestles and viaducts: (Continued)
  Chelsea. (See above, Boston)
  Chicago, Baltimore & Ohio R. R., over Calumet River, Largest bascule bridge, *697
  Chicago Great Western R. R. over Mississippi River, 137
  Chicago & West Michigan Ry., Reinforcing the Manistee River viaduct, 68, 71
  Cleveland, Cuyahoga River viaduct. Safeguarding displaced piers, *661
  Compensation for street railway use of highway bridge, Order of New Jersey Board of Public Utility Commissioners, 557
  Concrete ore trestles at Columbus works of Carnegie Steel Co., 376
  Concrete protection of girders and floor systems to insulate them from locomotive gases, York Road bridge, Philadelphia, *586
  Cumberland River, Louisville & Nashville Ry., *129, *244
  Dangerous viaduct approach in California town, *466
  Denver, Alameda Avenue subway, Unit costs, *66
  Direct-lift, by pivoted, rigidly connected, counterweight trusses. Designs developed by Strauss Bascule Bridge Co., *403
  Gunpowder River. (See below, Pennsylvania R. R.)
  Hampden R. R., Springfield to Bondsville, Mass., Erection details, *106
  Hannibal, Mo., Wabash R. R., over Mississippi River. Shifting bridge spans on barges, *500
  Highest concrete, Tunhannock viaduct, Delaware, Lackawanna & Western R. R., *594
  Incasing of steel bridges in ornamental concrete, Pennsylvania R. R., in Philadelphia, *401
  India, Erecting Paskey bridge over Ganges at flood stage, 264
  Investigations of old bridges, Necessity for, 649
  Liverpool, over Mersey River, Proposed suspension bridge. By L. H. Caase, 387
  Louisville & Nashville R. R. Paris to Winchester line in Kentucky, *298, *360
  Manistee River viaduct, Endurance of overworked iron, 24
  Martin's Creek viaduct. D., L. & W. R. R. Concrete construction; *710
  Memphis, Tenn.:
    Mississippi River, Double-track railway and highway bridge. Construction details, *516
    Illinois Central R. R., improvements, *720
  Montclair, N. J., Bloomfield Avenue. Hollow, reinforced-concrete boxes over culvert, *636
  Movable:
    Direct-lift, by pivoted, rigidly connected, counterweight trusses. Designs developed by Strauss Bascule Bridge Co., *403
    St. Maries, Idaho, across St. Joseph River. Low-cost swing bridge, *69
    Temporary turntable drawspan, Mystic River bridge, near Boston, *122
  Moving, Pitt River, Canadian Pacific Ry., 269
  Mystic River. (See above, Boston)
  National Transcontinental Railway, Canada, Notes, 678
  New Castle, Pa., Pennsylvania R. R. Recovering submerged bridge, *490
  New York City, Queensboro Rapid transit service, new construction for, *728
  New York Connecting R. R.:
    Details of ten-mile line across Hell Gate, *79; Comment, 58
    Substructure for East River Bridge division, *328, 729
  New York State highways, Standard types and detail of Department of Highways for steel girder and truss span bridges for suburban traffic, *361
  New Zealand, North Island Main Trunk Ry., 277
  Newark Bay, N. J., Pennsylvania and Lehigh Valley railroads. Rebuilding 3500 feet of trestle in twelve days, 69
Bridges, trestles and viaducts: (Continued)
  North Vancouver, B. C., Canadian engineers build bridge by hand labor, 692
  Norwalk, Conn., Washington Street. Ten reinforced-concrete spans and one double-leaf, bascule plate-girder span, *103
  Pennsylvania R. R.:
    Gunpowder and Bush Rivers:
      Designing concrete slab spans, 400; Comment, 393. By Edward Godfrey, c533
      Reinforced-concrete short-spans on pile foundations in deep mud, *144; Comment, 143
    Monongahela River, Erecting girders with derrick car, *269
    Philadelphia. Incasing unsightly steel bridge in ornamental concrete, *401
  Philadelphia, York Road, over Philadelphia & Reading Ry. Concrete protection for girders and floor systems, 586
  Philippine Islands. By H. F. Cameron, *172; Comment, 169
    Storm damage to concrete bridge, 78
  Pitt River, Canadian Pacific Ry., Moving railroad bridge to new site for highway service, 269
  Pittsburgh, Point Bridge, Concrete pile specifications, 581, 646
  Pontoon:
    Building of, in swift water of Missouri River by army engineers, 545
    Panama Canal, 444
  Quebec. Economic and technical features of bridge building. By Ralph Modjeski, *321, insert, *354, *383; Comment, 309
  Queensboro, New York City. Construction necessary for rapid transit service, *728
  Recovering submerged, New Castle, Pa., 490
  Red River, Louisville & Nashville R. R., Construction work, *270
  Richmond, Va., over James River, Prize design of B. H. Davis, *540
  Rough timber for trestle construction in British Columbia, *615
  St. Maries, Idaho, across St. Joseph River. Low-cost bridge, *69
  St. Petersburg, Peter the Great bridge, 166
  Short-span, Development of, 143
  South Africa, Cameron Midland Ry., Iron and steel bridge. By Alfred Gradenwitz, *134
  Spokane, Wash., Floor of hollow concrete tile, *647
  Trolley-wire slack distributor for lift bridge, Toledo, Ohio, 577
  Trussed concrete, Belfast, Ireland, 133
  Tunkhannock viaduct, Delaware, Lackawanna & Western R. R., near Nicholson, Pa. Continuous concreting of piers more than 200 feet high. 180-feet arch spans, *594
  Uhrichsville, Ohio, Novel repair job. By Edward Stingel, *53
  Weight and cost of different types of bridges in Buffalo, N. Y., based on contract prices, *640
  Wisconsin road law. By A. R. Hirst, 378
  World's greatest cantilever, insert, *321
Brooklyn Navy Yard, Pavement, Experimental granite-block, *181
Buenos Aires, Argentine Republic, Transportation facilities. System of underground railways to serve city and unite main terminals. By F. Lavis, *613
Buffalo, N. Y.:
  Bridges, Weight and cost of different types based on contract prices, *640
  Freight terminals, Study for unification of. By G. H. Kimball, 414, *431; Comment, 422, 451
Building codes:
  Iowa, Effort to sceure building ordinances, 592
  New York City, Revision, 170
  Revisions, 592
Building erection kink, *331

*Illustrated articles; c, correspondence.

- Building failures:
  - Cedar Rapids, Iowa. Collapse of 7-story, Stark-Lyman concrete building. Opinions concerning failure, *598; Comment, 592. By Carl Gaylor, c705; Report by C. A. P. Turner, *714
  - New York, Collapse of Orpheum Theater, Report by Alfred Ludwig of Bureau of Buildings, 569
- Building inspectors, Making by fiat. By H. L. Muchemore, c140
- Buildings:
  - Architectural requirements and engineering standards, 114. By H. G. Balcom, c166
  - Architecture, Iron age of, 623
  - Binghamton, N. Y., Fire and loss of forty lives, 113, 250. By S. G. Koon, c336
  - Boston, Waterfront pier sheds of steel, *275
  - Brooklyn, Ward Bread Co., Reinforced-concrete girders of unusual span, *503
  - Cedar Rapids, Iowa, Collapse of Stark-Lyman concrete building. Opinions concerning failure, *598; Comment, 592. By Carl Gayler, c705; Report by C. A. P. Turner, *714
  - Chicago:
    - Continental and Commercial National Bank, Sinking piers through soft clay, *470
    - Marshall Field extension, Street cave-in in front of, *677; Report by John Ericson, George Weston and J. A. Dailey, *715
  - Cincinnati. Union Central Life insurance Co., Deep excavations and underpinning in dry sand, *487
  - Detroit, Mich., Paint shop of Detroit United Rys., Reinforced concrete, *75
  - Freight terminal, Chicago, *188
  - Garage, Reinforced-concrete girders, Ward Bread Co., Brooklyn, *503
  - Height of:
    - Checking economical. By C. T. Coley, 21; G. W. Wolcott, c111; D. K. Boyd, c589
    - New York City:
      - Limitation on Fifth Avenue, 160
      - Restrictions proposed by Buildings Commission, 659; Comment, 650
  - Long Island City, N. Y., Loose-Wiles Biscuit Co., Construction of ten-story concrete building, *319
  - Mill buildings, Design of steel. By R. Fleming:
    - Practical considerations concerning members. Commercial features, architecture, drawings and specifications, 491
    - Review and discussion of practical considerations governing general features, proportioning and detailing, 467; Comment, 449
  - Mill roof trusses, Long-span, Youngstown, Ohio, *164
  - Moving, in San Francisco:
    - Residence moved without blocking traffic of street railway cars, *612
    - School building of 8000 tons, *581
  - New York City:
    - Church of St. Jean Baptiste. Steel framework, *433
    - Court House, Dispute over plans, 1. By A. N. Van Vleck, c84
    - Equitable:
      - Concrete chuting tower, *550
      - Excavation and substructure plant, *247
    - Foundation, Suspended grillage, 280
    - Height, Proposed limitation of, on Fifth Avenue, 160; Restrictions of Buildings Commission, 659; Comment, 650
    - Orpheum Theater, Collapse, Report by Alfred Ludwig, of Bureau of Buildings, 569
    - Woolworth:
      - Substructure and wind bracing. By S. F. Holtzman, *22
      - Water-supply system. Pump, filter and tank service. Distribution and pressure control. Fire protection, 44; Comment, 29
  - Philippine Islands. By H. F. Cameron, *172; Comment, 169
  - Pittsburg:
    - Completion with additional stories, 192
- Buildings:
  - Pittsburgh: (Continued)
    - Duff Mfg. Co., Steel and glass one-story shop, *234
  - Refuse disposal, San Francisco, *177
  - Rochester, N. Y., Railway station on New York Central Road, Steel roof trusses, *666
  - Salt Lake City, Utah, Concrete plant for capitol building, *526
  - San Francisco:
    - Machinery Hall of Panama-Pacific Exposition, Large timber structure, *237; Comment, 225
    - Moving 8000-ton school building, *581
    - Moving house over street cars in operation, *612
  - School buildings, Unit costs of, Boston, 386
  - Underpinning:
    - Dry sand in deep excavations, Cincinnati, *487
    - Retaining grillage foundations, Evening Post Building, New York, *176
    - Without needlebeams. By M. A. Connor, c*392
  - Ventilation of small theaters, Chicago, 479
  - Wooden, Machinery Hall of Panama-Pacific Exposition, *237; Comment, 225
- Bulkhead walls. (See Retaining walls)
- Bunk house in logging camp, 499
- Bureau of Standards, Scope of work of, 592

C

- Cableways, Concrete supports for aerial, 615
- Caissons:
  - Bridges of New York Connecting Ry., *328
  - Pneumatic, Scotia dam work, New York State Barge Canal, *248
- Calumet-Sag channel, Progress of construction work, 64
- Camps, Construction:
  - Arrowrock dam. By A. B. Mayhew, *116
  - Bunk house, Bloedel-Donovan Lumber Co., Alger, Washington. By J. J. Donovan, 499
  - Sanitation. Co-operation with the Red Cross Society, Proposed by Miss Mabel Boardman, 649
- Canada, Surveying and surveyors in. By J. A. Macdonald, 156
- Canadian collieries (See Mines, Electric power)
- Canadian institution of municipal engineers proposed. By R. O. Wynne-Roberts, c251
- Canadian Society of Civil Engineers, Proposed provincial divisions, 681
- Canal banks, Protecting sandy, North Platt reclamation project, 498
- Canals:
  - Atlantic coast canals recommended by the War Department, 217
  - Black River, N. Y., Report on surveys and estimates. By L. A. Burns, *157
  - Calumet-Sag channel, Progress of construction work, 64
  - Kaiser Wilhelm, Data, 376
  - Louisiana, Project for irrigation, navigation and hydroelectric power. By Welman Bradford, 55
  - Medina irrigation project, Concrete lined, *424
  - New York State Barge:
    - Effect on commerce, 559
    - Operating force, Need of organizing permanent, 621
    - Scotia dam, Pneumatic caissons in construction of, *246
  - Suez, Traffic for 1912, 56
  - Welland, Proposed. General features of the plan adopted, *35
- Carrier, Electric, for transporting mail, express or package freight. Demonstrating plant at Paterson, N. J., *387
- Cars:
  - Scale-testing, of Bureau of Standards. By A. H. Emery, Jr., *460
  - Street, Operation on heavy grades in severe weather, 102
- Catskill aqueduct:
  - Bronzes and brasses, Cracking of. Experiences, causes and prevention of trouble. By A. D. Flinn, 527; E. B. Rosa, W. P. Smith, 528; Comment, 508
- Catskill aqueduct: (Continued)
  - Concrete-block casting, Record output at Kensico dam, 503
  - Cover for shaft, Removable cast-steel high-pressure, *413
  - Narrows siphon. Flexible-joint submarine pipe line, 36 inches in diameter and 10,000 feet long. By A. D. Flinn, *317; Comment, 309
  - Progress of work, 563
  - Sarles tunnel, Concreting, *428
  - Tunnel and conduits in New York City. By W. E. Spear, 333
- Cattle-guards, Necessity for and type of. Conclusions adopted by the American Bridge and Railway Building Association, 502
- Cave-in of Randolph Street, Chicago, *677, *715
- Cedar Rapids, Iowa:
  - Collapse of Stark-Lyman concrete building. Opinions concerning failure, *598; Comment, 592. By Carl Gayler, c705; Report by C. A. P. Turner, *714
  - Sewer, Constructing brick storm, *304
- Cedar River bridge (See Bridges)
- Cement:
  - Autoclave test:
    - Analysis of results. By H. S. Spackman, 18
    - Contradictory figures. By L. R. Ferguson, 18
    - Discussion before the American Society for Testing Materials. By H. J. Force, R. J. Wig, L. R. Ferguson and H. S. Spackman, 13; Comment, 1
    - Report to the Association of American Portland Cement Manufacturers. By A. S. Cushman, 14; Comment, 1
    - Results obtained by Delaware, Lackawanna & Western R. R. By H. J. Force, 13
    - Study of available data. By A. S. Cushman, 14
    - Value of. By R. J. Wig, 16
  - Competition of foreign, 563
  - Growth of the industry on the Pacific Coast. By C. A. Newell, 474
  - Handling in bulk. Time study on the Chicago, Milwaukee & St. Paul Ry., on its retaining wall construction. By J. H. Libberton, *63
  - Production of natural cement in 1912, 9
  - Production of puzzolan in 1912, 28
  - Purchase of Portland cement under a bonus system proposed by the Philippine Bureau of Science. By W. C. Reibling, 215; Comment, 198
  - (See also Concrete)
- Cement manufacturing plant, Bamberton, B. C., Concrete sheet piling and heavy construction work, *123
- Cement mortars, Experiments on the action of various substances on. By R. K. Meade, 20
- Cement sieves, Proposed test for accuracy of. By Bernard Enright, E. B. Rosa, S. E. Thompson, C. M. Chapman, H. S. Spackman, c466; T. B. Lee, c533
- Chemical feeder. (See Water purification)
- Cherryvale, Kan., waterworks, Collecting, filtering and delivering water from a river six miles distant, *260
- Chicago, Ill.:
  - Ash-handling plant at 68th Street pumping station, 416
  - Bridge over Calumet River, Baltimore & Ohio R. R., Largest bascule bridge, *697
  - Buildings:
    - Marshall Field extension, Street cave-in in front of, *677; Report by John Ericson, George Weston and J. A. Dailey, *715
    - Sinking piers through soft clay, Continental and Commercial National Bank building, *470
  - Chicago Board of Education, Closed-shop idea in engineering, 310
  - Chicago Technical League of engineers. Affiliation with the American Federation of Labor. "Dragging down the profession," 649, c732
- Chicago, Ill.: (Continued)
  - Electrolysis clauses of Chicago street-car ordinance, 642
  - Freight terminal of Central Terminal Ry. (Soo Line). 18-acre storage and transfer station and yard, *188; Comment, 169
  - Garbage disposal:
    - Appraisal of plant of Chicago Reduction Co. Opinions of the appraisers. Disagreement on going value, 464; Comment, 451
    - Clay-hole dumps for garbage, 422
    - Ideas of Dr. W. O. Nance, 282
    - Situation in July, 58
  - Harbor versus park:
    - Conflict of park commission with Federal authorities, 563
    - Proposition of J. M. Ewen, *512
  - Park superintendents, Non-expert appointments, 679
  - Public health and preventable deaths, 679
  - Railway terminals:
    - Investigation proposed. Opinion of B. J. Arnold, 226
    - Report by B. J. Arnold to Citizens' Terminal Plan Committee, 597
    - Report by John F. Wallace to city council committee, 486; Comment, 480
  - Railways and the purchase of power from the Commonwealth Edison Co., 623
  - Road improvements: "A city marooned," 507
  - Street cave-in opposite 200-foot Marshall Field building, *677
  - Streets:
    - Care of, Report by Civil Service Commission and the Commissioner of Public Works, 558
    - Cleaning with motor-driven combined flushing and sprinkling machine, *602
  - Ventilation of small theaters, 479
- Chicopee, Mass., Cooley brook dam washout, *372
- Chillicothe, Ohio, Waterworks appraisements, 358
- Chimneys:
  - Brick, struck by lightning. By A. D. Williams, c*25
  - Brick, 250 feet high, for the J. Heinz Co., 416
  - Steel, with spread base, at power plant of Kentucky Co., Louisville, Ky., 542
- Cincinnati, Ohio:
  - Buildings of Union Central Life Insurance Co., Deep excavations and underpinning in dry sand, *487
  - Flood and rainfall during March and April. By J. W. Ellms, *48
- Cisterns, Reinforced-concrete, as part of fire protection water supply, San Francisco, Detail costs, *107
- Cities:
  - Commission form of government, 31, 197, 621
  - Consulting engineering advice, Economies of, 564
  - Engineers as department heads. Plea of American Institute of Consulting Engineers, 585
  - Engineer's work in municipal reorganization. By M. L. Cooke, 508
  - Engineer's place in the movement of city planning, 622
  - England, Municipal control in cities. By C. F. Wike, 175
  - Houston, Texas, Commission form of government, 621
  - Managers for cities, 197, 592
  - Model mining town of Kincaid, Mo., *639
  - Planning of city and transportation. By M. R. Maltbie, 65; Comment, 58
  - Suggestion for city engineers. By H. N. Ruttan, 352
- Clarksburg, W. Va., Water purification. Design and results of operation of mechanical filtration plant. Cost of filtered water. By H. W. Streeter, *7
- Cleveland, Ohio:
  - Brick pavement after flood acts as cantilever, *128
  - Commission form of government and the new charter, 31
  - Cuyahoga River viaduct, Safeguarding displaced piers, *661

*Illustrated articles; c, correspondence.

- Cleveland, Ohio: (Continued)
  - Water-filtration, Report of Commission, 110
- Coagulating basins. (See Water purification)
- Coal:
  - Analyses of 5,000 samples. Bureau of Mines, 412
  - Buying system, Madison, Wis., Saving, 236
  - Canadian statistics, 301
  - Handling plant, Panama Canal, at Cristobal and Balboa, 428
  - Storage plants, Subaqueous, of Indianapolis Light & Heat Co., 330
- Code of ethics. (See Engineering ethics)
- Cofferdams at Ohio River lock and dam No. 48, Failure. By J. C. Oakes, 120
- Coke, Canadian statistics, 301
- College journalism, 365
- Colorado water rights dispute, Government favors arbitrating, 549
- Columbus, Ohio:
  - Flood prevention:
    - Investigations by A. E. Morgan and J. W. Alvord, 38
    - Report. Methods proposed by J. W. Alvord and C. B. Burdick of Chicago for carrying a flood flow of not less than 150,000 second-feet, 343; Comment, 337
  - Garbage reduction plant, Operating results, 220
  - Water purification, using lime:
    - Research work. By C. P. Hoover and R. D. Scott, 257
    - Storing of lime. New bins and weighing apparatus, delivery in bulk and elimination of troubles from air slaking. By C. P. Hoover and C. J. Clarke, *9
- Column footings, Reinforced-concrete, Tests at University of Illinois, 126
- Column formulæ (See Beams and columns)
- Company-force work, Louisville & Nashville R. R., *162; Comment, 141
- Concrete and concrete construction:
  - Casting separate members at a special slab plant, Subway construction, Kansas City, *228
  - Cement plant, Bamberton, B. C., *123
  - Cold weather and protection against freezing of concrete, 394
  - Column footing tests at University of Illinois, 126
  - Consistency of wet concrete, Method of determining. By C. M. Chapman, 52
  - Deep-water concreting, Starting through a tube, *531
  - Designing concrete slab spans for bridge, Pennsylvania R. R., 400; Comment, 393. By Edward Godfrey, c533
  - Drilling as a test for concrete. Experiments at University of Wisconsin to determine relation between compressive strength and speed of boring in concrete. By C. S. Duke, *670
  - Durability of mass concrete, Holtwood dam, *528
  - Graphical analysis of double-reinforced concrete sections, c*252
  - Gravel in place of broken stone and sand, Illinois specifications, 244
  - Hot lard pitted floor in building of Union Stock Yards of Chicago. By J. N. Jensen, 602
  - Loan periods on reinforced-concrete structures, 147
  - Martin's Creek viaduct, D., L. & W. R. R., *710
  - Patching disintegrated concrete, *723
  - Proportions of mixtures after hardening, Determining. By H. Burchartz, 278
  - Rerolled-bar specification, American Society for Testing Materials, 1
  - Salts, Effect of, on strength of Concrete. Tests at University of Wisconsin by H. E. Pulver and S. E. Johnson, 466
  - Sea defenses in England. By J. S. Owens and J. F. Wood, 240
  - Stresses in steel reinforcement, Prussian regulations, 579
  - Supports for aerial tramways, 615
  - Surface finish, Catskill aqueduct, 11
- Concrete and concrete construction: (Continued)
  - Test of sand. Blocks made from wet mortar of same consistency as used on work. By W. R. Reinke, 202
  - Tests of reinforced slabs under concentrated loading to determine the effective width of slabs. By A. T. Goldbeck, 154; Discussion by W. A. Slater, 155
  - Towers, Self-supporting and novel chute supports, St. Paul, Minn., *235
  - Wall footing tests at University of Illinois, 126
  - Wash for concrete, 149
  - Waterproofing of concrete, Report at American Society for Testing Materials, 39; Comment, 29
  - Wearing qualities of a floor surface. By C. H. Johnson, c111
- Concrete mixing and handling:
  - Antelope Valley siphon, Los Angeles Aqueduct. By W. W. Hurlbutt, *60
  - Arrowrock dam, Boise, Idaho. By M. G. Doll, *265
  - Catskill aqueduct, at Kensico dam. Record output in block casting, 503
  - Chuting tower on viaduct forms of New York Connecting Ry. bridge, *729
  - Depositing concrete on pile foundations under water in cofferdams and in submerged forms, Passaic and Hackensack River bridges, *698
  - Elephant Butte dam construction Large mixers and hydraulically operated measuring hoppers. By L. C. Hill, *368; Comment, 365
  - Harlem river subway tunnel, *404
  - Jetty work at Humboldt Bay, Cal. By M. L. Tower, 464
  - Kansas City, Subway construction, *228
  - Loose-Wiles Biscuit Co., Long Island City, N. Y., Construction of ten-story building, *319
  - Movable chuting tower, Equitable Building, New York, *550
  - Movable steel tower plant, Bayonne, N. J., 544
  - New York, on Lexington Avenue subway, 51, *404, 493
  - New York Connecting Ry., Bridge work, *328
  - Pacific Gas & Electric Co., Construction of Spaulding dam, *150
  - Portable dragline cableway for unloading and conveying material directly from cars to mixer, designed by W. B. Louer, of Chicago, *544
  - Rapid work, Lexington Avenue subway, New York, 493
  - Reservoir at Regina, Can. By R. O. Wynne-Roberts, *267
  - Roads in Wayne County, Mich., *340
  - St. Paul, Minn., Self-supporting towers and novel chute supports, *235
  - Sarles tunnel of the Catskill aqueduct, *428
  - Utah capital building at Salt Lake City, *426
- Concrete wall, Breaking up, San Francisco, *546
- Condemnation of property, New York State, 480
- Construction camps. (See Camps, Construction)
- Construction Company. (See Engineering construction company)
- Construction work, Small-sized drawings for, Western Canada Power Co., 54
- Consulting engineering advice, Economics of, 564
- Continuation school movement, 537
- Contracts and contractors:
  - Bond issues, Life of, 253
  - Bonus and penalty form of contract, San Francisco, 254
  - Bonus system for the purchase of Portland cement, Philippine Bureau of Science. By W. C. Reibling, 215; Comment, 198
  - Bonus system for riveting, Los Angeles aqueduct. By W. W. Hurlbut, 61
- Contracts and contractors: (Continued)
  - Delays on contracts, Governmental responsibility for, 62
  - Discretionary clauses in contracts. By C. F. Dingman, c280; W. B. King, c308
  - Engineer, contractor and inspector in road construction. By F. L. Cranford, 700; F. E. Ellis, 724
  - Forfeiture of certified check. By E. L. Bader, c307; W. F. Schophorst, c364; B. C. Lechler, c446
  - Larceny of ideas and double dealing by a certain manufacturing company, 366
  - Motor trucks, Use of:
    - Cost data, 43
    - Discussion by Motor Truck Club, 30
  - Problems of the contractor in organizing and construction of building. By L. C. Wason, 693
  - Road contracts. By H. C. Hill, F. L. Crawford, 700
  - Road contracts, Legal suggestions. By W. L. Bowman, 408
  - Unfairness to the contractor. By G. H. Chase, c166; Comment, 142; C. F. Dingman, c476
  - Unit price, lump sum and percentage work in road construction. By H. C. Hill, 700
  - (See also Camps, Construction)
- Copper alloys, "Season cracking," Experiences on Catskill aqueduct. By A. D. Flinn, 527; E. B. Rosa, W. P. Smith, 528; Comment, 508
- Corrosion:
  - Electrolytic, of iron in soils. Investigation by Bureau of Standards. By Burton McCollum and K. H. Logan, 34; Comment, 29
  - Mine equipment, Electrolytic method of preventing in, Investigation by Bureau of Mines. Report by J. K. Clement and L. V. Walker, 215; E. L. Connell, c280
  - Pipe corrosion, Decarbonation of water to prevent. By G. C. Whipple, 213
  - (See also Paints, Rust-preventing)
- Creosote and creosoting of timber. (See Timber preservation)
- Crevasse in Beulah levee, Closure of, with water flowing through. History of former breaks. By A. L. Dabney, *4; Correction, 153
- Crib construction, Use of rough timber, *615
- Culverts:
  - Concrete, combined with street crossing, San Antonio, Texas, *148
  - Louisville & Nashville R. R., *359
  - Wisconsin road law. By A. R. Hirst, 378
- Cumberland, Md., Engine terminal Baltimore & Ohio R. R., *411

D.

- Dams:
  - Assuan, Raising the dam. By Wilfrid Stokes, c112
  - Boise project:
    - Arrowrock dam:
      - Concrete mixing and handling plant. By M. G. Doll, *265
      - Construction. Concrete mixing and handling plant. By M. G. Doll, *265
      - Construction camps. By A. B. Mayhew, *116
    - Rolling dam. By C. H. Paul, *125
  - Concrete, Resistance to erosive force of stream carrying sand and silt, Salt River dam, Arizona. Five years of service. By A. L. Harris, *541
  - Cooley brook, Chicopee, Mass., Washout, *372
  - Elephant Butte, Rio Grande irrigation project. Construction methods and plant equipment. Concrete mixers and special measuring hoppers. By L. C. Hill, *368; Comment, 365
  - Elverum, Norway, *583
  - Germany. Flood-control reservoirs, *72
  - Holtwood, Pennsylvania Power and Water Co., Durability of mass concrete, *528; Sealing flashboards, 722
- Dams: (Continued)
  - Kensico, Valhalla, N. Y., Thermophones for temperature measurement, *119
  - Lister, Germany, Dedication, 280
  - Pittsfield, Mass., Cyclopean masonry. By H. A. Miller, 291
  - Piute County, Utah, Otter Creek Reservoir Co. Excavation with hydraulic nozzles and pump for removing spoil in core trench. By Joseph Jenson, *522
  - Puntledge River hydroelectric power plant, *312
  - Rolling dam:
    - Advantages of, 564
    - Boise project. By C. H. Paul, *125
    - Design of. Methods of calculation and data on structures built and under consideration in United States and Europe. By A. G. Hillberg, *654; Comment, 649
  - Salt River, near Phoenix, Arizona. Resistance of concrete dam against force of stream carrying sand and silt. Experience of five years. By A. L. Harris, *541
  - Scotia, N. Y., New York State Barge Canal. Use of pneumatic caissons, *248
  - Spaulding, Yuba River, Cal., Pacific Gas & Electric Co., Design and construction of cyclopean masonry structure, *150
  - Sunol, San Francisco, Cal. Flow over model. Discharge estimated by means of weir gagings at a one-twentieth scale structure of wood. By J. N. LeConte, *193
  - Temperature measurement, Thermophones for, Kensico dam, Valhalla, N. Y., *119
  - White River plant. Ambursen type with concrete deck, *135
  - White Salmon River, Northwestern Electric Co., near Portland, Ore. By R. M. Overstreet, *396
- Dayton, Ohio:
  - City manager, 197, 592
  - Flood, Effect of, on pavements and sewers. Damage and repair work. By G. C. Cummin, *357
  - Flood-prevention plans:
    - Investigations by A. E. Morgan and J. W. Alvord, 38
    - Preliminary report by Morgan Engineering Co. Advantages of cooperation among communities, 146, 399; Comment, 393
  - Goethals proposed as manager of city government, 592
- Decarbonation of public water supplies to remove corrosive properties. By G. C. Whipple, 213
- Denver, Col.:
  - Floods of Cherry Creek, Controlling. Report of commission of engineers, 81; Comment, 57
  - Subway, Alameda Avenue open cut. Construction and unit costs, *66
  - Water case decision, 3
  - Water supply, Reading turbidity at night, *352
- Derricks, Erection, supported independently of concrete floors, *297
- Designing structures for the future, 707
- Destructors. (See Refuse disposal)
- Detroit, Mich.:
  - Paint shop of Detroit United Rys., Reinforced-concrete, *75
  - Paving, Novel methods in concrete work, *374
- Diesel, Dr. Rudolph, Death of, 421
- Docks. (See Wharves and docks)
- Draft tubes, Concrete, method of designing. By R. Dubs, *161
- Drafting table, Standard, University of Illinois. By A. F. Comstock, *494
- Drain tile:
  - Strength of. Investigations at the engineering experiment station of Iowa State College. By D. A. Marston and A. O. Anderson, 46
  - Testing. By Mont Schuyler, *695
- Drainage of Florida Everglades. Report of Board of Engineers, D. W. Mead, Leonard Metcalf and Allen Hazen, on feasibility, 454; Comment, 450
- Drawings, Small-sized, for construction work, Western Canada Power Co., 54

*Illustrated articles; c, correspondence.

- Dredges and dredging:
  - British Columbia fleet. Operating costs of five different types of dredges and auxiliary plant. Causes of delay. By H. A. Bayfield, *209, c364; Comment, 197
  - Havana harbor work, *587
  - Improvement for advancing dredge in line of operation, 277
  - Neponset River, Mass., Dipper-dredge work to remedy insanitary conditions. By E. M. Blake, *551
- Dressing room for mine workmen, 414
- Drills and drilling:
  - Electric well drills in a cement quarry, Glens Falls, N. Y., 128
  - Hammer drills operated by compressed air in highway construction, New York State, 137
  - Rock drilling in Tennessee River below Chattanooga. Results and cost of work. By J. E. Hall, 488
  - Scow for submarine rock drilling in East River, New York City, between North and South Brothers Islands, *600
  - Troubles, c446
- Drydocks:
  - Floating, Advantages of. By James Fowler, 42
  - Keokuk, Iowa. Arched mitering lower gates and disappearing upper gates, operated by compressed air, *88; Comment, 85
  - Norfolk, Va., Delay on contract, Governmental responsibility for, 62
- Dry-feed apparatus for chemicals used in water purification. By Allen Hazen, *71
- Dumping device for cars in quarries, Warren Silica Co., Torpedo, Pa., *318
- Dynamometer wagon for road resistance tests, Washington, D. C., *631

E

- Earthwork. (See Embankments)
- Economic conditions, Investigation of by National Civic Federation, 565
- Education:
  - Classics, Value of, as viewed by an engineer. By C. P. Steinmetz, 158; Comment, 141; W. H. Drane, c251
  - Continuation school movement, 537
  - Industrial, in Berne, Switzerland. By F. P. McKibben, 164; Comment, 141
  - Valuation of railways, Courses in colleges suggested by John A. Atkinson, 309
  - (See also Engineering education)
- Efficiency in industrial organizations, Extending range of, 536
- Efficiency studies, Limitations of, 592
- Electric trucks. (See Motor trucks)
- Electrical industry, Frank A. Vanderlip quoted, 281
- Electricity, Cost of manufacturing, in very large stations. By H. M. Hobart, Comment, 311
- Electrification (See Railways)
- Electrolysis:
  - Chicago street car ordinance, 642
  - Water pipes in Seattle, Wash., 706
- Electrolytic corrosion of iron in soils. Investigation by the Bureau of Standards. By Burton McCollum and K. H. Logan, 34; Comment, 29
- Elevators, Grain, Canadian Pacific R. R., at Transcona, Winnipeg. Sinking and tilting of elevator, 479
- Elverum, Norway, Hydroelectric plant designed to operate where frazil conditions prevail, *583
- Embankments:
  - Calculation of dock and bulkhead walls. By A. M. Case, c734
  - Protecting sandy canal banks, 498
  - Repair of Beulah levee crevasse. By A. L. Dabney, *4
  - Shrinkage allowance. Two definite standards to cover extra top width. By J. C. L. Fish, *459; T. B. Lee, c589
- Employees:
  - Arbitration Board, Amending the Erdman Act, 29
  - Convict labor on roads. By J. H. Pratt, 701
- Employees: (Continued)
  - Efficiency, Higher, through consideration by employers, 226
  - Efficiency of municipal, Rating. By G. L. Davenport, Jr. c26
  - Mexican labor. By N. G. Near, c307
  - Piecework system in Philippine road construction, 82
  - Safety medals awarded by American Museum of Safety, 679
  - Schools. (See Education)
  - Strike losses, Reparation for, Pennsylvania R. R., 1
  - Strikes, Winning "from within," Paterson, N. J., 1
  - Trainmen and economy, Arbitration of higher wage demands, 337
  - (See also Contracts and contractors)
- Engine terminals. (See Railway terminals)
- Engineering:
  - Highway, 114
  - History of, and technical museums, 593
  - Logging. By James O'Hearne, 549, 592; L. W. Duffee, c706
- Engineering construction company:
  - Organization of. By R. M. Henderson, 187; Comment, 199
  - Organizing and executing the construction of a reinforced-concrete industrial building. By L. C. Wason, 693
  - Production supervisor and work schedules, 199
- Engineering education:
  - Classics, Value of, as viewed by an engineer. By C. P. Steinmetz, 158; Comment, 141; W. H. Drane, c251
  - Combined training in engineering and in finance and administration, Massachusetts Institute of Technology, 170, c418
  - Efficiency in technical education. Importance of the engineering school in the development of professional ideals and suggestion as to ways to make it more potent. By W. F. M. Goss, 658; Comment, 650
  - Highway engineering, 114
  - Industrial management, Fitting students for, 170, c418
  - Logging engineering, Suggestions for college course. By James O'Hearne, 549, 592
  - Practical work for instructors, 113
  - Principles versus practice in the teaching of engineering, 339. By A. M. Wolf, c447
  - Sanitation and public health course by Harvard University and Massachusetts Institute of Technology, 386
- Engineering ethics:
  - Code of, Pacific Northwest Society of Engineers, 50. By W. H. Drane, c112; J. A. Jackson, c166; H. F. Tucker, c195; D. B. Luten, c335; Ernest McCullough, c590
  - Larceny of ideas and double dealing by a certain manufacturing company, 366
  - Sherman law and agreements between engineers not to enter competitions. D. B. Luten, c335; Ernest McCullough, c590
- Engineering notation, Report of the Concrete Institute in London, 114
- Engineering profession:
  - Closed-shop idea, Conditions in Chicago Board of Education, 310
  - Standards of the profession. Chicago Technical League of Engineers affiliates with the American Federation of Labor. "Dragging down the profession," 649
- Engineering research and its co-ordination. By G. H. Roberts, 226
- Engineers:
  - Accountant and the engineer, 709
  - Calculations of subordinates, Responsibility for, 143
  - Change of location and its effect. By J. B. Holt, c307
  - Chicago Technical League of Engineers affiliates with American Federation of Labor. "Dragging down the profession," 649, c732
  - City engineers, Suggestion for. By H. N. Ruttan, 352
  - Consulting engineering advice, Economics of, 564
- Engineers: (Continued)
  - Consulting engineers, Purchasing through, 310
  - Contractor, engineer and inspector in road construction. By F. L. Cranford, 700; F. E. Ellis, 724
  - Developing engineering executives, 480
  - Efficiency, Limitations of efficiency studies, 592
  - Ethics. (See Engineering ethics)
  - False economy in not employing competent engineers, 199. By K. L. Van Auken, c280
  - Licensing of. By E. G. Kastenhuber, Jr., c26
  - Members of commission boards, or controlling bodies, 393. By E. C. Hurd, c504; Comment, 507
  - Members of public service commissions. Suggestions to Gov. Glynn of New York by American Institute of Consulting Engineers, 545; Comment, 535
  - Municipal department heads. Plea for appointment of technical men to administrative positions by American Institute of Consulting Engineers, 585
  - Municipal work, Place in. By L. M. Cooke, 508
  - Opportunities for engineers, 281
  - Sherman law. (See Engineering ethics)
  - Titles of railroad engineers, 225
  - Valuation, of Interstate Commerce Commission, Ratings for. By J. B. Wright, c705
- Engines, Portable, Efficiency of small, German report, 508
  - (See also Gas engine)
- England. (See Great Britain)
- Erie, Pa., Timber crib dock reconstruction, *152
- Ethics. (See Engineering ethics)
- Evanston, Ill. Water purification, 12,000,000-gallon plant. Rapid filter plant with ridge-block underdrainage system to purify water from Lake Michigan. By Langdon Pearse, *578
- Everglades. (See Florida Everglades)
- Excavation:
  - Costs, Boston, 76
  - Data on earth excavation. By E. W. Robinson, 634
  - Denver, Alameda Avenue subway, *66
  - Hydraulic nozzles, Use of, at Piute irrigation dam, Utah. By Joseph Jenson, *522
  - Lexington Avenue subway. (See New York City)
  - Submarine work, Vancouver, B. C., 297
- Explosives. Hauling nitroglycerine with a motor truck, 134

F

- Ferry boat, Steel hull erected twice before launching, Seattle, Wash., 354
- Filing case for street profiles, Lima, Ohio, 48
- Filter for boiler feed and cooling water at Omaha, *546
- Filtration. (See Sewage treatment; Water purification)
- Fire protection:
  - Automatic sprinklers. By S. G. Koon, c336
  - Education in fire prevention, Bulletins of National Fire Protection Association, 507
  - San Francisco water supply:
    - Combination of cisterns and pumps drawing water from the bay and reservoirs. By A. J. Cleary, *107; Comment, 85
    - Formulae for weights of cast tees and crosses, *236
    - Pipe joint tests. By A. J. Cleary, *119
  - Water-supply service, Current practice in the United States. By Leonard Metcalf, 51
- Fires:
  - Binghamton, N. Y., 113, 250. By S. G. Koon, c336
  - Oil fires, Fighting with sawdust, 695
  - Preventing forest fires in British Columbia, 334
  - Rocky Mountains Forest Reserve. By W. N. Miller, 464
- Fires: (Continued)
  - Underground, on Champlain barge canal, 702
- Flagpole, Erection of one-piece, 208 feet long, Vancouver, B. C., *356
- Flood damage, Deferred, 57
- Flood-predicting system for the Miami Valley, Ohio, 305
- Flood prevention:
  - Denver, Report of engineering commission, 81; Comment, 57
  - Discussion. By W. E. Fuller. Comment, 394
  - England, Organization of a "Rivers Board." Proposed by Reginald Brown, 365
  - Frequency of floods and their control. By R. E. Horton, c505
  - Germany. Construction and operation of flood control reservoirs, *72
  - Ohio valley:
    - Investigations at Dayton and Columbus. By A. E. Morgan and J. W. Alvord, 38
    - Public demand for results from studies, 170
    - Report by Board of army engineers, 426
    - Report by John W. Hill recommending changes in course of Miami River, 599; Comment, 592
    - Report on local measures and reservoir systems, by Morgan Engineering Co., 146, 399; Comment, 393
    - Report. Methods proposed by J. W. Alvord and C. B. Burdick of Chicago for carrying a flood flow of not less than 150,000 second-feet, 343; Comment, 337
  - Olean, N. Y. Report by G. C. Diehl, 337
  - Portsmouth, Ohio, Flood wall. By J. I. Hudson, *712
  - Sacramento Valley, Plan for control. By T. G. Dabney, c251
- Floods in the Ohio Valley, March and April, 1913. Losses. By J. W. Ellms, *48; A. H. Horter and A. J. Jackson, 439; 627
- Floors:
  - Composition flooring, Comparison of, with 18 other materials. By H. M. Hooker, 635
  - Concrete, Wearing qualities of. By C. H. Johnson, c111
  - Creosoted wood blocks for factory and warehouse. By F. A. Weaver, 185
  - Dry rot in. By D. E. Hooker, c26
  - Mill floor independent of wall settlement and waterproofed at column points, Ludlow, Mass., 731
  - Vibration in, Remedying, *250
  - (See also Bridge floors)
- Florida Everglades, Drainage of. Report of Board of Engineers, D. W. Mead, Leonard Metcalf and Allen Hazen on feasibility, 454; Comment, 450
- Flow of water. (See Pipe)
- Flumes:
  - Concrete, Congdon Ditch, near North Yakima, Wash. Landslide failed to wreck structure, *571
  - Iron, Irrigation work in San Diego County, Cal., *153
  - Steel-lined, for sluicing sand and gravel, Tacoma, Wash., *702
  - Wooden, Puntledge River power plant, *313
- Forests and forestry:
  - British Columbia, Sales of standing timber, 515
  - Fire losses, Reduction in, 352
  - Fire losses in the United States, 678
  - State lands, Use of, for municipal works and state canals, 480
- Fort Smith, Ark., Settling basin, Break of baffle wall, *619
- Foundations:
  - Bridge pier, Reinforcing a scoured. By Edward Stingel, *182
  - Bridges, New York Connecting Ry., *328
  - Sinking piers through soft clay, Chicago, *470
  - Suspended building grillage, New York, 280
  - Underpinning and retaining grillage, Evening Post Building, New York, *176
  - Woolworth Building, New York. By S. F. Holtzman, *22

*Illustrated articles; c, correspondence.

- Freight terminals. (See Railway terminals)
- Frost-proof bench mark, Winnipeg, Canada, *646
- Fuel. (See Coal; Oil)
- Fuel for donkey engines, Comparison of wood, coal and iron, 646

G

- Gage, Strain, in testing materials. By W. A. Slater and H. F. Moore, *132
- Gaillard, Lieut.-Col. David DuB., Death of, 649
- Garbage disposal. (See Refuse disposal)
- Gas, Illuminating, Legal specifications for. Heating value standard preferable to candlepower regulation. By E. B. Rosa and R. S. McBride, 171
- Gas engine. Diesel-electric drive for ships, 282
- Gas lighting, High-pressure, in Europe and America, 395
- Gas producer and steam plants, Comparative economy of, for pumping stations. Records of five years of Delaware Water Co. and Octoraro Water Co., near Philadelphia. By J. E. Gibson, 262
- Gates, Lock, at Keokuk, Iowa, *88; Comment, 85
- Genoa, Italy, Subway project, 45
- Geological Survey, Pay of officials, 707
- Germany:
  - Bridge at Bendsburg over Kaiser Wilhelm Canal, Erection details, *577
  - Flood-prevention and water-conservation. Principal features of reservoir systems and laws of construction and operation *72
- Ginpole for erecting plate-girder bridge, *106
- Girders, Reinforced-concrete, of unusual span in Brooklyn garage, *503
- Goethals as city manager for Dayton, Ohio, 592
- Governor for water-wheels, New Swiss type, *186
- Grade-crossing elimination:
  - Pittsburgh, at Second Avenue and Try Street. Improvements embodying several types of masonry and bridge-floor design. Pennsylvania R.R., *32
  - Report of New Jersey Board of Public Utility Commissioners, Comment, 339
- Grade reductions on railways. Practical analysis of justifiable expenditure on typical 130-mile division, Illinois Central R.R. By C. P. Howard, 375
- Grades, Finding the point of intersection of two. By Erwin Davis, c*84; R. S. Beard, c*734
- Grain elevators, Canadian Pacific R.R., at Transcona, Winnipeg. Sinking and tilting of elevator, 479
- Grandstand failures, 535
- Granite pavements. (See Roads and pavements)
- Granite production in the U. S., 342
- Great Britain:
  - City planning, Municipal control of. By C. F. Wike, 175
  - English Channel tunnel proposed, 230, 449; By C. O. Burge, *499
  - Railway policy, Appointment of a Royal Commission, 563
  - Roads of England, Traffic and wear statistics. By C. H. Cooper, 638
- Great Salt Lake, Variation in level of. By H. S. Kleinschmidt, c84
- Groined arches. (See Arches)

H

- Hannibal, Mo., Bridge of Wabash R.R., Shifting spans on barges, *500
- Harbors:
  - Bahia, Brazil, 105
  - Chicago, Proposed plans of J. M. Ewen, *512
  - Havana, Cuba, Dredging work, *587
  - New York, Development of New Jersey waterfront. Preliminary report by B. F. Cresson, Jr., 525
- Harbors: (Continued)
  - Philippine Islands, Improvements. By H. F. Cameron, *203
  - Port organization and development. By A. G. Lyster, 570, 611
  - San Francisco, Improvements. Plans of State Harbor Board for handling increased shipping after opening of Panama Canal. By F. G. White, *49
  - Sanitation. (See Rivers, Sanitation)
  - Seattle, Wash., Developments. By W. L. Kidston, *221
- Harlem River tunnel. (See New York City, Lexington Avenue subway)
- Harrisburg, Pa., Water purification plant:
  - Filter patent decision, 287
  - Operating expenses, 120
- Hetch Hetchy. (See San Francisco)
- Hours of labor. (See Employees)
- Houston, Tex., Commission form of government, 621
- Humboldt Bay jetties, Rebuilding. By L. M. Tower, 464
- Hydraulic turbines. (See Turbines)
- Hydraulics:
  - Friction head in backwater problems. By I. P. Church, c*168
  - Test of flow over model of Sunol dam, San Francisco, Cal. By J. N. Le Conte, *193
  - (See also Pipe)
- Hydroelectric power plants:
  - Cedar Rapids, St. Lawrence River. 18 turbines under 30-ft. head, *461; Comment, 450
  - Consolidation of power systems, Tendency toward, 623
  - Cost of manufacturing electricity in very large stations. By H. M. Hobart, Comment, 311
  - Draft tubes. (See Draft tubes)
  - Earnings from water power at Wachusett dam, 104
  - Economies in large plants discussed by P. M. Lincoln, 481
  - Elverum. (See below, Norway)
  - Niagara Falls Power Co. Turbines of 5500-hp. with 54-inch runners and cylinder-gate speed control to replace old turbines of 1895, *443; Comment, 421
  - Norway:
    - Elverum on the Glommen River: Plant with reinforced concrete designed to operate where frazil conditions prevail, *583
    - Romsdalen developments, 474
  - Pacific Gas & Electric Co.:
    - South Yuba-Bear River power development. By J. P. Jollyman, *573
    - Spaulding dam of cyclopean masonry, *150
  - Puntledge River, Vancouver Island, B. C., Canadian Collieries (Dunsmuir). Layout and design of 19,000 hp. plant using water delivered under 350-foot head by wood-stave penstocks, *312, *340
  - Rates, Publishing of, 86
  - San Francisquito station, Los Angeles aqueduct:
    - Butterfly gates, *327
    - General description, *218; Comment, 197
    - Surge tank, *299; Comment, 281; By R. D. Johnson, c420; Correction, 644
  - Spain, at Catalonia, 259
  - Structural progress in power distribution, 537
  - Tata Hydroelectric Power Supply Co., India. Storage lakes, expansion pipe joints, power house and transmission line, *529
  - Thousand Springs, Idaho, on north end of Snake River. General plan and equipment, *489
  - White River, near Forsyth, Mo., Ozark Power and Water Co., General features, *135
  - White Salmon River, Northwestern Electric Co., near Portland, Ore. Dam and wood-stave pipe line. By R. M. Overstreet, *396
- Hypochlorite treatment. (See Water purification)

I

- Illumination engineering (See Lighting)
- Imhoff tank (See Sewage treatment)
- Incandescent lamps, Improvement in design and manufacture, 3
- Incineration (See Refuse disposal)
- India:
  - Reclamation project for Bombay, 140
  - Tata hydroelectric development. Storage lakes, expansion pipe joints, power house and transmission line, *529
- Indianapolis, Building code passed by City Council, 592
- Industrial education (See Education; Engineering education)
- Industrial organizations, Extending range of efficiency, 536
- Industrial plants:
  - Danger signals, Colored. Blue-yellow combination advocated by Dr. F. D. Patterson, 487
  - Duff Mfg. Co., Pittsburg, Steel and glass one-story shop, *234
  - Terryville, Conn., Hydroelectric plant of Andrew Terry Co., 39
- Industrial prosperity, Relation to "big business." Discussion by C. R. Van Hise, 479
- International Engineering Congress, 1915, in San Francisco, 449
- International Road Congress, London, 1913, 57. By W. D. Sohier, 405
- Interstate Commerce Commission:
  - Engineers as members of. By E. C. Hurd, c504; Comment, 507
  - Engineers as members of, Letter by American Institute of Consulting Engineers to President Wilson, 694
  - Railway valuations:
    - Ratings for engineers. By J. B. Wright, c705
    - Specifications for maps and profiles. Objections made by railways, 292; Comment, 282, 507. By C. L. Van Auken, c364
  - Report on government ownership; Comment, 708
- Investigations, Correct interpretation of, 366
- Iron and steel:
  - Canadian statistics, 301
  - Electrolytic corrosion in soils. Investigation by the Bureau of Standards. By Burton McCollum and K. H. Logan, 34; Comment, 29
  - Endurance of overworked iron in Manistee River viaduct, 24
  - Magnetic ore beds in the Blackfeet Indian Reservation, 448
  - Ore statistics, 274
  - Production of bars in 1912 for concrete work, 438
  - Production of pig iron, 191
- Irrigation:
  - Arabia, Adana Desert, 472
  - Boise, Idaho:
    - Concrete mixing and handling plant at Arrowrock dam. By M. G. Doll, *265
    - Construction camp at Arrowrock dam. By A. B. Mayhew, *116
    - Rolling dam. By C. H. Paul, *125
  - Co-operation of state and federal governments in Oregon and California. By E. G. Hopson, 685
  - Criticism of the Reclamation Service, 253
  - Government projects, Conditions on. Investigations by F. H. Newell, 703
  - Inefficiency of irrigation. Investigation of causes which influence economic application of water made on one of the systems of the Punjab in India. By A. S. Gibb, 608
  - Louisiana. Projected canal routes. By Welman Bradford, 55
  - Medina Irrigation Co., San Antonio, Texas. Reinforced-concrete siphons at river crossings, metal flumes and concrete lined canal, *424
  - Pala Indian reservation in San Diego County, Cal., Light-iron flume, *153
  - Palouse, Washington, Investigation, 120
  - Philippine Islands. By H. F. Cameron, *202
- Irrigation: (Continued)
  - Piute County, Utah, Otter Creek Reservoir Co. Building cut-off wall. By Joseph Jenson, *522
  - Pumping plants. By E. V. Berg, 53
  - Rio Grande. Elephant Butte dam construction. By L. C. Hill, *368; Comment, 365
  - Santa Cruz Valley, Ariz. Recovery of underground water by wells and pumps. By M. C. Hinderlider, *200, *242; A. L. Collins, c476, *589
  - Use of government irrigated lands, 197
- Isthmian canal (See Panama canal)
- Italy, Highway tunnel in Venice, 291

J

- Jetties at Humboldt Bay, California, Rebuilding. By M. L. Tower, 464

K

- Kansas City, Mo., Subway construction. Reinforced-concrete columns, girders and slabs cast at special plant, *228
- Kansas pond week, 253. By Benjamin Brooks, c336
- Keokuk, Iowa, Lock and drydock, Arched mitering lower gates and disappearing upper gates, operated by compressed air, *88; Comment, 85
- Kincaid, Mo., Model mining town. Workers own their own homes. High grade of men developed, *639
- Kuhn collapse, 57

L

- Labor (See Contracts and contractors; Employees)
- Lake Erie, Proposed dam at outlet of, *206
- Lamps, Electric, Improvement in design and manufacture, 3
- Land reclamation in Florida Everglades, Report of Board of Engineers on feasibility, 454; Comment, 450
- Land slides, Prevention by underground system of reinforced-concrete posts and tie rods. Scheme on the Panama Canal. By G. S. Rice, 76
- Lead poisoning (See Painting)
- Leaks in mains (See Pipe)
- Legal:
  - City not forced to expend appropriation, Boston, 1
  - Contracts, Governmental responsibility for delays on, 62
  - Denver water case, 3
  - Filter patent, New York Continental Jewel Filtration Co., 287
  - Riparian rights, Decision of Judge Morris of U. S. District Court, 479
  - Strike losses, Reparation for, Pennsylvania R. R., 1
- Lighting:
  - Colors of artificial lights, 681
  - Cotton-mill lighting. By A. L. Pearson, 460
  - Factory lighting economics. By M. H. Flexmer and A. O. Dicker, Comment, 422
  - Gas lighting in Europe and America, 394
  - Progress in illumination engineering, 367
- Lightning arresters, Concrete resistors for, 464
- Lima, Ohio, Filing case for street profiles, 48
- Lime for water softening, Storing of. Storage bins and weighing apparatus, delivery in bulk and elimination of troubles from air slaking, Columbus, Ohio. By C. J. Clarke and C. P. Hoover, *9
- Lime sterilization (See Water purification)
- Lining of tunnels (See Tunnels and tunneling)
- Liquid fuel (See Oil as fuel)
- Liverpool, Eng., Proposed suspension bridge over Mersey River. By L. H. Casse, 387
- Loads on bridges. (See Bridge loads)

*Illustrated articles; c, correspondence.

- Locks at Keokuk, Iowa. Arched mitering gates and disappearing upper gates, operated by compressed air, *88; Comment, 85
- Locks at Panama. (See Panama Canal)
- Locomotives:
  - Diesel-engine, Prusso-Hessian State Ry., 309
  - Fuel economy possibilities, 121
  - Oil-burning, Catskill aqueduct work, *428
  - Towing locomotives for Panama canal, 381
- Logging engineering, Suggestions for collgee course. By James O'Hearne, 549; 592; By L. W. Duffee, c706
- London, Traffic regulations and street accidents, 367
- Long Island City, N. Y. Loose-Wiles Biscuit Co., Construction of ten-story concrete building, *319
- Los Angeles, Cal.:
  - Pavements, Cost of concrete base. By C. S. Pope, 637
  - Water mains to annexed districts of 670
  - Water ordinance, Number of services on pipe, 94
- Los Angeles aqueduct:
  - Antelope Valley siphon. Four-mile concrete and steel pipe riveted under bonus system. By W. W. Hurlbut, *60
  - Completion. Details of financing, general construction, costs and wages. By W. W. Hurlbut, *482; 563
  - Jawbone siphon, Designing, for minimum weight of metal consistent with safety. By E. R. Bowen, *682
  - List of articles published in Engineering Record, 1906-1913, 486
  - San Francisquito power station:
    - Butterfly gates, *327
    - General description, *218; Comment, 197
    - Surge tank, *299; Comment, 281; By R. D. Johnson, c420, c733; Correction, 644; W. F. Durand, c733
- Louisville, Ky.:
  - Smokestack of steel with spread base, 542
  - Water purification, Micro-organism troubles and how they were remedied. By F. H. Stover, 100

M.

- Macadam. (See Roads and pavements)
- Madison, Wis., Fuel saving at pumping station, 236
- Mains. (See Pipe)
- Massachusetts Institute of Technology, Combined training in engineering and in finance and administration, 170
- Mathematical theory, Limitations of. By W. G. Button, 518
- Mechanical filtration. (See Water purification)
- Medina irrigation project, San Antonio, Texas. Reinforced-concrete siphons at river crossings, metal flumes and concrete lined canal, *424
- Memphis, Tenn.:
  - Bridge over Mississippi River. Construction details of double-track railway and highway bridge, *516
  - Earth excavation data. By E. W. Robinson, 634
  - Illinois Central R. R. improvements, *720
- Metal work, Protection of, from corrosion. (See Paints, Rust-preventing)
- Meters. (See Water meters)
- Methelyene-blue test. (See Water pollution)
- Metric system, Increasing use of, 709
- Micro-organism troubles (See Water purification)
- Mills (See Buildings)
- Mines:
  - Corrosion in equipment, Electrolytic method of preventing. Investigation by Bureau of Mines. By J. K. Clement and L. V. Walker, 215; E. L. Conwell, c280
- Mines: (Continued)
  - Electric power in Canadian Collieries (Dunsmuir), Puntledge River Vancouver Island, B. C. Hydro-electric power plant of 19,000 hp. using water delivered under 350-foot head by wood-stave penstocks, *312, *349
- Minneapolis, Minn., Performance of waterworks turbine pumps. By E. P. Burch, 12
- Moline, Ill.:
  - Micro-organisms in water. By L. A. Fritze, c56
  - Water filtration plant, Condition of wash water in mechanical filters. By L. A. Fritze, *430
- Montclair, N. J.:
  - Bridge, Bloomfield Avenue, Hollow reinforced-concrete triangular boxes over culvert, *636
  - Railway terminal improvements, D., L. & W. R.R., *495
- Montreal, Water filters, Frost damage. Repair methods and report by board of experts. By F. E. Field, *566
- Mortars, Cement, Experiments on the action of various substances on. By R. K. Meade, 20
- Motorbuses in New York City. Report by John A. McCollum on conditions in London and Paris, Comment, 651
- Motor trucks:
  - Coal oil, Use of, in Columbus, Ohio, 161
  - Contractors' use of, Discussion by Motor Truck Club, 30
  - Cost data on trucks used by contractors, 43
  - Paving work, Use in, Boston, *205
  - Rescue work of Bureau of Mines for use in Pittsburgh, 469
- Mount Washington, N. H., Pumping water against pressure of 2250 pounds. By C. B. Edwards, *690
- Moving pictures, Teaching by, 225
- Municipal organization. (See Cities)
- Muskogee, Okla., Reservoir. Design of concrete. By Alexander Potter, *616

N

- National Association of Paving Brick Manufacturers, Inspection of pavements at Cleveland, Detroit and in Wayne County, Michigan, 338
- National Civic Federation:
  - Investigation of economic conditions, 565
  - Model utility bill, 680
- National Conservation Congress, Water power policy of Congressional committee endorsed by, 601; Comment, 593
- National Highway Association, Grasping propaganda of, 169, 254. By C. H. Davis, c335
- Neutral axis in curved or bent beams, Location of. By J. P. Shamberger, c*590
- New England Waterworks Association:
  - Convention, 289
  - Water filter operation committee, 309
- New Jersey waterfront, Development of. Preliminary report by B. F. Cresson, Jr., 525
- New York Barge Canal:
  - Effect on commerce, 559
  - Operating force, Need for organizing permanent, 621
  - Scotia dam, Pneumatic caissons in construction of, *248
- New York City:
  - Astoria tunnel of the Consolidated Gas Co., Completion, *95
  - Billboard advertising, Disfigurement by, 225
  - Bridge, Queensboro, Construction necessary for rapid transit service, *728
  - Building code revision, 170
  - Buildings (See Buildings, New York City)
  - Catskill aqueduct tunnel and conduits. By W. E. Spear, 333
  - Exhibition by Heights of Building Commission. City planning and the engineer, 622
  - Lexington Avenue subway:
    - Accident precautions. By Maurice Deutsch, c56
- New York City:
  - Lexington Avenue subway: (Continued)
    - Concrete mixing and placing, Rapid work, 493
    - Concreting Harlem river section, *404
    - Excavating rock and quicksand 50 feet below tide level. New methods of bracing and street support, *575
    - Excavation on section 1A, Use of sectional roof shields and pilot girders, *147; Comment, 141
    - Excavation on section 2A, *216
    - Harlem river section:
      - Concreting, *404
      - Floating and sinking of tubes, *284, *390; Comment, 281, 372; Correction, 490
      - Four-track steel tube assembled near site and sunk and concreted in dredged trench, *556
    - Pneumatic caisson piers, 524
    - Timbering and draining covered subway trench in quicksand, 249
    - Underpinning stone retaining wall, 362
  - "Mayor's eye," What it has seen, 702
  - Motorbuses, Report of John A. McCollum on conditions in London and Paris, Comment, 651
  - Pavements:
    - Asphaltic concrete, Laying of, on Riverside Drive, 479
    - Inventory, Methods and costs of, by five survey parties. By G. W. N. Hallock, *643
  - Rapid transit construction, 632
  - River and harbor changes, Proposed. By T. K. Thomson, c*167
  - Safety on streets, Recklessness in driving mail trucks, 592
  - Sewer, White Plains Avenue, 527
  - Smoke ordinance, 86
  - Street cleaning, Report of Commissioner W. H. Edwards for 1912, 427
  - Street openings, Regulation of, 198
  - Subway lines, New, 441
  - Water supply, Croton, Protection recommended by the Comptroller, 179
  - Water-waste prevention. By I. M. De Varona, 11; W. W. Brush, *289
  - Water-waste problem with abundance of water, 227
- New York State:
  - Constitutional amendments, 541
  - Water powers and the right of eminent domain discussed by Arthur J. Baldwin, 517; By Clemens Herschel, c704
- New York State Public Service Commission, Appointments to, by Governor Sulzer, 57
- Niagara Falls, N. Y., Turbines of Niagara Falls Power Co., Ten 5500-hp. wheels, *443; Comment, 421
- Niagara River pollution. Preliminary report of investigation by International Joint Commission, 373
- Niagara River weir. Report by International Waterways Commission, *206
- North Platt reclamation project, Protecting sandy canal banks, 498
- Norwalk, Conn., Bridge at Washington Street. Ten reinforced-concrete spans and one double-leaf, bascule plate-girder span, *103
- Norway:
  - Elverum hydroelectric plant designed to operate where frazil conditions prevail, *583
  - Romsdalen developments, 474
- Notation (See Engineering notation)

O

- Ocean Grove, N. J., Sewer outfall, Launching a submerged. By M. R. Pugh, *279
- Ohio floods (See Flood prevention)
- Oil as fuel in the propulsion of ships. By C. Zulver, L. R. Freeman, Comments, 423
- Oil-spraying machine for track, Delaware, Lackawanna & Western R.R., *316
- Oldham, England. Sludge disposal by Grossman process, 74
- Olean, N. Y., Flood protection, Report by G. C. Diehl, 337
- Omaha, Neb., Boiler feed-water filter, *546
- Oysters and sewage disposal. By G. A. Johnson, 294
- Ozone as room disinfectant and deodorizer. Reports discredit claims of manufacturers. Comment by Dr. C. P. Steinmetz, 645; J. F. Norton, c732

P

- Pacific Northwest Society of Engineers, Code of ethics, 50; by W. H. Drane, c112; J. A. Jackson, c166; H. F. Lucker, c195
- Paint shop, Reinforced-concrete, Detroit United Rys., *75
- Painting, Hazard of lead poisoning. Investigation by Dr. E. R. Hayhurst of both outdoor and indoor work. Practice in foreign countries, 509
- Paints:
  - Rust-preventing properties of certain paints for metalwork and results of five-year panel tests. By H. A. Gardner, 93, *insert.
  - Test for indicating relative priming and top-coat values. By M. McNaughton of Joseph Dixon Crucible Co., 19
- Pana, Ill., Waterworks extensions. By A. C. Stanfield, *96
- Panama-California Exposition, General description, *555
- Panama canal:
  - Artistic character of structures. Report by D. C. French and F. L. Olmsted, 412
  - Cable pulling record, 316
  - Coal-handling plants at Cristobal and Balboa, 428
  - Control system for locks, Centralized electrical, *730
  - Culebra cut, End of dry excavation, 413
  - Erection of lock gates. Methods of fabricating steel and adjusting vertical bearings for 92 leaves having total weight of about 58,000 tons, *513; Comment, 507
  - Finishing touches, 421
  - Gaillard, Lieut.-Col. David DuB., Death of, 649
  - Gatun Lake on final rise, 106
  - Land-slide prevention by means of underground system of reinforced-concrete posts and tie rods. By G. S. Rice, 76
  - Lock gates completed, 610
  - Miraflores spillway dam, 374
  - Opening of canal. Blowing up Gamboa Dike, 241, 333, 421, *477
  - Pontoon bridge, 444
  - Report of G. W. Goethals for the year ended June 30, 1913. Summary of engineering features of report, 603
  - Retired equipment, 287
  - Towing locomotives, 381
  - Water supply, 410
  - Waterworks at Colon, 192
  - Year's progress. Pictorial record of final stages of work and completed structure, Insert, *627
- Panama-Pacific Exposition, 1915:
  - German machine-tool manufacturers, Attitude of, 365
  - International Engineering Congress, 449
  - Machinery Hall, One of the largest timber structures ever erected, *237; Comment, 225
- Papers presented before technical societies, Rules governing, in American Society of Civil Engineers, 178
- Pavements (See Roads and pavements)
- Pend d' Oreille River power development, 145; Comment, 142
- Penstocks (See Pipe)
- Peoria, Ill., Sewer system design, 535
- Philadelphia, Pa.:
  - Bridges:
    - Broad Street, Pennsylvania R.R., Girder spans incased in ornamental concrete, *401
    - York Road, over Philadelphia & Reading Ry. Concrete protection for girders and floor system, *586
  - Mortality rates in relation to water supply. By J. A. Vogleson, 290
  - Municipal reorganization, An engineer's work. By M. L. Cooke, 508

*Illustrated articles; c, correspondence.

- Philadelphia, Pa.: (Continued)
  - Pavements:
    - Experimental section on Byberry and Bensalem Turnpike, of different kinds of material, *628
    - Progress and cost of construction for 1913, 632
  - Sewage treatment:
    - Pennypack Creek works. Apparatus and operating results. By W. L. Stevenson, *256
    - Report on European conditions. By G. E. Datesman, 386
  - Water purification, Operation of Torresdale filter plant. By F. D. West, 290
- Philippine Islands:
  - Public works under the American régime. By H. F. Cameron, *172, *202; Comment, 169
  - Road construction:
    - Piecework system, 82
    - Preventing erosion of embankments by a grass thatch, 134
    - Use of native labor and of coral building material. By D. E. Henry, 641
- Piece-work system (See Employees)
- Piers:
  - Pneumatic caisson, for New York subway tunnel, 524
  - Sinking through soft clay, Chicago, *470
- Piers, Bridge:
  - Chelsea Bridge North, Pivot pier. Hollow concrete shaft and foundations built in submerged basket crib, *138
  - Concrete, Tunhannock viaduct, Delaware, Lackawanna & Western R.R., *594
  - Martin's Creek viaduct, D., L. & W. R. R., *710
  - New York Connecting Ry., *328
  - Passaic and Hackensack River bridges, Central R.R. of N. J., Deep-water piers, *698
  - Reinforcing a scoured foundation, Tuscarawas County, Ohio. By Edward Stingel, *182
  - Safeguarding displaced piers in Cleveland. Drainage system. Underpinning and rebuilding foundations, *661
- Piers, Waterfront (See Wharves and docks)
- Pile driver, Operation by gasoline engine on dock construction, Glacier National Park, Montana, 320
- Piles:
  - Concrete specifications. Method of construction and installation, loading tests, settlement and capacity, Point Bridge, Pittsburgh, 581, 646
  - Driving, with an inverted machine, Manistee River viaduct, 71
- Pipe:
  - Arched penstock, Self-supporting, France, *274
  - Bending cast-iron pipe. By C. W. Sherman, 40
  - Break in steel lock-bar pipes, Lockport, N. Y., 68
  - Corrosion, Decarbonation of water to prevent. By G. C. Whipple, 213
  - Designing steel pipe for minimum weight of metal consistent with safety. By E. R. Bowen, *682
  - Diameter of a penstock, How to find economical. By F. H. Carter, 725
  - Flow of water in. New formula for wood-stave, cast-iron, riveted-steel and concrete conduits. By E. A. Moritz, *667
  - Flow of water in bends, Formula of Jacobs and Sooy, 727
  - Formulæ for weights of cast tees and crosses, San Francisco fire protection system, *236
  - Hauling submerged water main with steam winch, Vancouver, B. C., *263
  - Laying pipe rapidly, San Diego, Cal., *179; Comment, 169
  - Laying submerged water main on pile supports at Richmond, B. C., *554
  - Leaks in water mains, Locating. By F. T. Hoxie, *291
  - Life of riveted steel waterpipe, Vancouver, B. C., 521
  - Loss of head in pipe bends. Compilation of existing data. Discussion of various formulas. By W. E. Fuller, *381
- Pipe: (Continued)
  - Reinforced-concrete, 11.8-ft. diameter, Elverum, Norway, hydroelectric plant, *583
  - Reinforced-concrete, Los Angeles aqueduct. Cost analysis. By W. W. Hurlbut, 61
  - Sewer pipe, Strength of. Investigations at the engineering experiment station of Iowa State College. By D. A. Marston and A. O. Anderson, 46
  - Steel riveted pipe, Los Angeles aqueduct. Field costs. Bonus rate for riveting crew. By W. W. Hurlbut, 61
  - Submarine line of Catskill aqueduct across the Narrows, New York Harbor. By A. D. Flinn, *317; Comment, 309
  - Testing drain tile and sewer pipe. By Mont Schuyler, *695
  - Testing water-pipe in trench, San Francisco, Device for, *531
  - Thawing frozen water pipe by electricity, *272
  - Valves for penstocks. Brake arrangement for flap valves, Norwegian, *105
  - Wood-stave:
    - Puntledge River power plant, *313, *349
    - White Salmon River power development. By R. M. Overstreet, *396
- Pipe joints:
  - Flexible, for submarine line of Catskill aqueduct across the Narrows, New York Harbor. By A. D. Flinn, *317
  - Tests of, San Francisco fire protection water supply system. By A. J. Cleary, *119
- Piqua, Ohio, Track elevation, *547
- Pittsburgh, Pa.:
  - Bridge. Point Bridge, Concrete pile specifications, 581
  - Buildings:
    - Duff Mfg. Co., Steel and glass one-story shop, *234
    - First National Bank, Completion with additional stories, 192
  - Grade-crossing elimination at Second Avenue and Try Street. Improvements embodying several types of masonry and bridge-floor design. Pennsylvania R.R., *32
  - Smoke nuisance, Report by John J. O'Connor, 540
- Pittsfield, Mass., New cyclopean masonry dam. By H. A. Miller, 291
- Piute irrigation dam, Methods of building cut-off wall. By Joseph Jenson, *522
- Pole-holes, Blasting in frozen ground, Marion, Ind., 610
- Poles, Wooden, Reinforced at ground line, Tests in Pittsburgh, 356
- Pond week in Kansas, 253; by Benjamin Brooks, c336; L. L. Dyche, c418; W. S. Gearhart, c418
- Port organization and development. By A. G. Lyster, 570, 611
- Portland, Ore.:
  - Bridge, Harriman, Fire damage. By J. W. Cunningham, c*224; Comment, 197
  - Weed ordinance, 202
- Portsmouth, Ohio, Flood wall. By J. I. Hudson, *712
- Power distribution, Structural progress, 537
- Power plants (See Hydroelectric power plants)
- Prismoidal formulæ to suit special cases. By W. T. Case, c*140; Correction, 385
- Public service commissions:
  - Engineers as members of, 393. By E. C. Hurd, c504; Comment, 507
    - Suggestions to Gov. Glynn of New York by American Institute of Consulting Engineers, 545; Comment, 535
  - Regulation of companies by, Preparation of companies for. By W. J. Norton, 283
- Public service corporations:
  - Engineer and the accountant, 709
  - Model utility bill of National Civic Federation, 680
  - Rates and rate-making in Wisconsin. By Halford Erickson, 42
- Public service corporations: (Continued)
  - Regulation, Necessity of a preliminary preparatory period. By W. J. Norton, 283
  - Safety movement, 679
- Public works—for service or the builder's profit, 651
- Pulsograph tests for water-waste, New York City. By W. W. Brush, *289
- Pumping plants:
  - Comparative economy of producer gas and steam. Records of five years of Delaware Water Co. and Octoraro Water Co., near Philadelphia. By J. E. Gibson, 262, c392
  - Irrigation. By E. V. Berg, 53
  - Portable irrigation, on Sacramento River, Cal., 291
- Pumping water against pressure of 2250 pounds at Mount Washington, N. H. By C. B. Edwards, *690
- Pumps:
  - Buying small, 253
  - Humphrey direct-explosion, Performance of at Chingford, England. By G. E. Datesman, 412
  - Turbine, at Minneapolis waterworks, Performance. By E. P. Burch, 12
- Puntledge River hydroelectric plant, Vancouver Island, B. C., Canadian Colleries (Dunsmuir). Layout and design of 19,000 hp. plant using water delivered under 350-foot head by wood-stave penstocks, *312, *349
- Purchasing through the consulting engineer, 310

Q

- Quarry cars, Dumping device for, Warren Silica Co., Torpedo, Pa., *318
- Quarrying, using electric well drills, Glens Falls, N. Y., 128

R

- Rails. T-rails in paved streets, Experience of Connecticut Co., on electric lines, *552
- Railway accidents:
  - New York, New Haven & Hartford, North Haven, 253, 309, 365
  - Pennsylvania, R. R., Tyrone, Pa., Divided responsibility, 225
- Railway bills in state legislatures, 464
- Railway embankments (See Embankments)
- Railway finance in a nutshell, Comments by Mr. Howard Elliott, 141
- Railway stations:
  - Memphis, Tenn., Illinois Central R. R., *720
  - Rochester, N. Y., New York Central Road, Steel roof trusses, *666
  - Troy, N. Y., Depressed concourse. By J. R. Taft, *691
- Railway terminals:
  - Baltimore & Ohio R. R. Engine terminal at Cumberland, Md., *411
  - Buffalo, N. Y., Freight terminals, Study for the unification of. By G. H. Kimball, 414, *431; Comment, 422, 451
  - Chicago:
    - Investigation by B. J. Arnold, 226
    - Report by B. J. Arnold to Citizens' Terminal Plan Committee, 597
    - Report by John F. Wallace to city council committee, 486; Comment, 480
  - Chicago, Central Terminal Ry (Soo Line). 18-acre storage and transfer station and yard, *188, Comment, 169
  - Montclair, N. J., D., L. & W. R. R. Passenger terminal and separate freight layout, *495
- Railways:
  - Arbitration bill, Newlands, 85
  - Baltimore & Ohio:
    - Bridge at Chicago, Largest basculé bridge, *697
    - Engine terminal at Cumberland, Md, *411
  - Buenos Aires, Argentine Republic. Electrification and elimination of grade crossings. By F. Lavis, 615
  - Canada, Construction in the west, 2
  - Canadian Pacific:
    - Grain elevator at Transcona, Winnipeg, Sinking and tilting of, 479
- Railways:
  - Canadian Pacific: (Continued)
    - Rogers Pass tunneling, Multiple-entry method proposed, 470
    - Tree windbreaks to replace portable snow fences, *47
  - Central Railroad of Georgia, Teaching fuel economy by moving pictures, 225
  - Central Railroad of New Jersey, Deep-water piers for Passaic and Hackensack River bridges, *698
  - Chicago, Milwaukee & St. Paul, Electrification of mountain divisions, 629; Comment, 709
  - Chicago surface and elevated lines, Purchased power for, 623
  - Delaware, Lackawanna & Western:
    - Martin's Crek viaduct, Concrete construction, *710
    - Montclair branch improvements in bridges, stations and masonry work, *495, *687
    - Oil-spraying machine for track, *316
    - Terminal improvements at Montclair, N. J., *495
    - Tunkhannock viaduct, *594
  - Electrification and the "battle of the currents," 708
  - Electrification as an engineering problem. By A. H. Armstrong, 716; Discussion by George Gibbs, H. H. Vaughn, E. B. Katté, W. S. Murray, 718; Comment, 708
  - Electrification of railways a conserver of natural resouces. By G. P. Cole, 686
  - Electrification of steam roads in mountain districts. Investigation by Southern Pacific R. R. By A. H. Babcock, 314
  - Federal control of operation, Report of Interstate Commerce Commission on the North Haven accident, New York, New Haven & Hartford R. R., 365; Comment, 708
  - Government ownership proposed by Iowa Senators, 679
  - Grade-crossing elimination, Report of New Jersey Board of Public Utility Commissioners, Comment, 339
  - Grade-reduction factors. Practical analysis of justifiable expenditure on typical 130-mile division, Illinois Central R. R. By C. P. Howard, 375
  - Great Britain. Royal Commission for inquiry into relations between railways and the state, 563
  - Highest in the world, 324; By W. L. Gibson, c420
  - Illinois Central:
    - Grade reductions. Practical analysis of justifiable expenditure on typical 130-mile division. By C. P. Howard, 375
    - Memphis improvements, *720
  - India, Cost of light railway, 43
  - Indo-Ceylon Ry., Opening of, 163
  - Louisville & Nashville:
    - Bridge over Cumberland River, *244
    - Company-force work. Special equipment and results on grade revision and double-tracking, *162; Comment, 141
    - Cut-off between Winchester and Irvine, Ky. Heavy grading and high viaducts, *270
    - Features of line between Nashville and Birmingham. Unusual reinforced work, *129
    - Features of reconstruction and new construction from Irvine, *359
    - Grade revision from Paris to Winchester, Ky., *298
    - Relocation and grade reduction, *97; Comment, 86
    - Tunnels, Blount and Hayden mountain, *232
  - Mount Washington rock railway, Supplying water to locomotives. By C. B. Edwards, *690
  - National Transcontinental, Canada, Notes on bridge, 678
  - New York Central, Dissolution rumor, 707
  - New York Connecting:
    - Bridges, viaducts and embankment work on ten-mile line across Hell Gate, *79; Comment, 58
    - Substructure for East River Bridge division, *328, *729
  - New York, New Haven & Hartford:
    - Accident at North Haven, 253, 309, 365

*Illustrated articles; c, correspondence.

- Railways:
  - N. Y., N. H. & H.: (Continued)
    - Electrification experience. By W. S. Murray, 718
    - Hadley, president of Yale University, a director, 337
  - Northwestern Pacific, Closing 100-mile gap between San Francisco and Eureka with line through Rugged Eel River Valley, *664
  - Pennsylvania:
    - Accident at Tyrone, Pa., Divided responsibility, 225
    - Bridges over the Gunpowder and Bush Rivers, Philadelphia, Baltimore and Washington Division, *144, 400; Comment, 143, 393. By Edward Godfrey, c533
    - Electrifications at Philadelphia, 707
    - Lines west of Pittsburgh, Flood damage, *301
  - Philippine Islands. By H. F. Cameron, 204
  - Pittsburg, Cincinnati & St. Louis Ry., Track elevation at Piqua, Ohio, *547
  - Prusso-Hession State Ry., Diesel-engine locomotive, 309
  - Ruskin-Stave Falls line, built at Columbia. Hewed and rough timber construction. Cost and other data on crib and trestle work, 615
  - Safety medal awards of American Museum of Safety, 679
  - Southern Pacific, Electrification, Officers adverse to, after investigation. By A. H. Babcock, 314
  - Statistics of operating revenues and expenses, 1909-1913, 400
  - Statistics of steam roads in the United States, 104
  - Street:
    - Car operation on heavy grades in severe weather, 102
    - Transportation and city planning. By M. R. Maltbie, 65; Comment, 58
  - Valuation of steam roads. B. E. C. Hurd, c111; F. C. Boes, c533
    - Carriers' suggestions issued by Thomas W. Hulme of the Presidents' Conference Committee, 327
    - Courses at Missouri State University suggested by John A. Atkinson, 309
    - Interstate Commerce Commission:
      - Preliminary organization, Division into districts and other lines of progress, 620
      - Ratings for valuation engineers. By J. B. Wright, c705
      - Specifications for maps and profiles. Objections made by railways, 292; Comment, 282, 507; By C. L. Van Auken, c364
  - Windbreaks, Tree, to replace portable snow fences, Canadian Pacific Ry., *47
  - Yazoo & Mississippi, Memphis improvements, *720
- Rainfall at Cincinnati, during March and April. By J. W. Ellms, 48
- Rates and rate-making under Wisconsin public-utility law. By Halford Erickson, 42
- Rates for electric service, Publishing of, 86
- Refuse disposal:
  - Chicago:
    - Appraisal of plant of Chicago Reduction Co. Opinions of the appraisers. Disagreement on going value, 464; Comment, 451
    - Clay-hole dumps for garbage, 422
    - Idea of Dr. W. O. Nance on the feeding of garbage, 282
    - Situation in July, 58
  - Columbus, Ohio, Operation of garbage reduction plant, 220
  - Day and night collection of municipal wastes. By W. H. Edwards, 296
  - New York City bids, Profit in reduction, 113
  - San Francisco, Islais Creek plant. Latest ideas in incinerator practice, *177
- Regina, Can., Construction of Tor Hill reservoir. By R. O. Wynne-Roberts, *265
- Reinforced concrete (See Concrete)
- Researches, Interpreting restricted, 366
- Reservoirs:
  - Concrete:
    - Deep circular reservoir with roof slab on steel frame, Regina, Can. By R. O. Wynne-Roberts, *267
    - Design of circular, at Muskogee, Okla. By Alexander Potter, *616
  - Dayton, Ohio, the Lewistown and Loramie, Report of Morgan Engineering Co., 146
  - Germany. Construction and operation of flood control reservoirs. Tabulation, *72
  - Groined arch water filtration. Failure in Baltimore. Data on other arches in United States and Canada. By J. W. Armstrong, *538
  - Muskogee, Okla. Design of circular concrete. By Alexander Potter, *616
  - Regina, Can., Tor Hill. Circular reinforced-concrete, with roof slab on steel frame. By R. O. Wynne-Roberts, *267
  - Wachusett, Erosion of shores, 128
- Retaining walls:
  - Building cut-off wall. Use of hydraulic nozzles for excavation and pump for removing spoil in core trench, Piute irrigation dam. By Joseph Jenson, *522
  - Calculation of. Discussion of forces and loads. By Wolmar Fellenius, *325
  - Cost diagram. By E. F. Kriegsman, *157
  - Falmouth Heights, Mass., Construction criticized. By L. E. Moore, *324, c420; K. A. Albert, c*420
  - Flood wall, Portsmouth, Ohio. By J. I. Hudson, *712
  - How not to build. By L. E. Moore, *324, c420, c504; K. A. Albert, c*420, c504; R. W. Gelder, D. N. Becker, c*501
  - Reinforced concrete, England. By J. S. Owens and F. J. Wood, 240
  - Underpinning stone walls, New York subway work, 362
- Richmond, B. C., Laying submerged water main on pile supports, *554
- Richmond, Va., Bridge over James River, Prize design of B. H. Davis, *540
- Rivers:
  - Columbia, Running sand from bar and building jetty, 731
  - Formulas for stream flow and the Ohio floods, 363
  - Miami, Flood-prevention plans. By A. E. Morgan and J. W. Alvord, 38
    - Report by John W. Hill, 599; Comment, 592
  - Mississippi, Closure of Beulah levee crevasse with water flowing through. History of former breaks and construction methods. By A. L. Dabney, *4; Correction, 153
  - Missouri, Changes in, 627
  - Neponset, Mass., Dipper-dredge work to remedy insanitary conditions. By E. M. Blake, *551
  - Niagara:
    - Pollution of. Preliminary report of investigation by International Joint Commission, 373
    - Weir, Report by International Waterways Commission, *206
  - Ohio, Lock and dam No. 48, Failure of cofferdam. By J. C. Oakes, 120
  - Riparian rights, Decision of Judge Morris of U. S. District Court, 479
  - Sanitary control of. Report by American Public Health Association, 293
  - Sanitation, Rational basis for. By G. A. Soper, 294
  - Tennessee, Rock drilling below Chattanooga. Results and cost of work. By J. E. Hall, 488
- Riveting, Bonus system for, Los Angeles. aqueduct. By W. W. Hurlbut, 61
- Roads and pavements:
  - Accelerated pavement tests in public at American Road Congress, *457; Comment, 449, 450, c562
  - Administration problems. By E. A. Stevens, 673
  - Alabama. Methods and costs of work, organization of field forces, and studies of plant for hauling and storing crushed stone. By P. S. Fitzgerald, 626
  - American Highway Association, Convention, 254, 377, 393, 401, 405, 680
- Roads and pavements: (Continued)
  - American Road Builders' Association, Convention, 672, 700, 680
  - Asphalt, Sand gradings where motor traffic is heavy, 479
  - Asphalt cements and road binders. Qualities bituminous should possess and laboratory tests necessary for their proper determination. By J. W. Howard, 345; W. W. Crosby, c417; H. B. Pullar, c534; Comment, 337, 421
  - Baltimore, Md., Brick pavement. By R. K. Compton, 436
  - Banff-Windermere automobile road through Rocky Mountains of Alberta and British Columbia, *630
  - Bituminous construction. By S. D. Foster, 379
    - Philadelphia test road, *628
  - Bond issues for road improvement. By S. E. Bradt, 380
  - Brick construction. By J. M. McCleary, 407
    - Baltimore, Md. By R. K. Compton, 436
    - Cleveland, Pavement acts as cantilever after flood, *128
    - Observations on brick pavements on the rattler test. By Mont Schuyler, c447; W. P. Blair, c561
    - Test data and costs of section containing fourteen varieties of brick laid by the U. S. Office of Public Roads. By J. T. Voshell, *347
    - Tests, using the "Determinator" at the American Road Congress in Detroit, *457; Comment, 449, 450
    - Wire-cut lug blocks, Use of. By F. B. Marsh, *37; Comment, 30
  - Brick manufactured from furnace slag, Middlesborough, England, 241
  - California, its $18,000,000 state system. By A. B. Fletcher, 379
  - Chicago, Report on care of streets by the Civil Service Commission and the Commissioner of Public Works, 558
  - Cleveland, Brick pavement, after flood, acts as cantilever, *128
  - Concrete:
    - Base for pavements, Cost of Los Angeles, Cal. By C. S. Pope, 637
    - California, between Sacramento and Oregon, *389
    - Cook County, Ill., near Evanston. Experimental road, *653
    - Cracking. By A. N. Johnson, 471
    - Detroit, Mich., Novel methods, *374
    - Expansion and contraction measurement, Chevy Chase Road, Washington, D. C. By A. T. Goldbeck, *76
    - Riverside Drive, New York. Laying of three inches of asphaltic concrete, 479
    - Tests of 4-inch highway slab with road roller in California, 432
    - Tests, using the "Determinator" at the American Road Congress in Detroit, *457; Comment, 449, 450
    - Troweling machine, Automatic, at Detroit, Mich., *374
    - Washington, D. C., Chevy Chase Road, Expansion and contraction measurements. By A. T. Goldbeck, *76
    - Wayne County, Mich. Built principally by day labor, *340; Comment, 338; By F. F. Rogers, 409
    - Winona County, Minn., 8-foot roads with 4-foot crushed limestone shoulders, *159; Comment, 141
  - Consolidation of the highway conventions, 680
  - Contracts, Legal suggestions respecting. By W. L. Bowman, 408
  - Convict labor. By J. H. Pratt, 701
  - Cook County, Ill., Experimental concrete road, *653
  - Cost of highway systems in Europe and America, 421
  - Cube pavements of Monroe County, New York. Service tests and costs of gravel concrete, clay-ash and vitrified shale laid since 1908 near Rochester, N. Y. By W. G. Harger, *624; Comment, 621
  - Dayton, Ohio, Effects of flood. Damage and repair work. By G. C. Cummin, *357
  - Details in paving work, Variations from standard practice, 479
- Roads and pavements: (Continued)
  - Detroit, Mich., Concrete Novel methods, *374
  - Economy of motor trucks in paving work, Boston, *205
  - Educational work in highway engineering, 114
  - Engineer, inspector and contractor. By F. L. Cranford, 700; F. E. Ellis, 724
  - England:
    - Observations. By C. O. Burge, c196
    - Traffic and wear statistics. By C. H. Cooper, 638
  - English books on highways printed in 1712 and discovered in the Library of Congress, 646
  - Erosion of earth embankments prevented by a grass thatch, Philippine Islands, 134
  - Fillers, Hard and soft, Recommendations in New York state by Department of Efficiency and Economy, 680
  - "Good-Roads Days" in Missouri, 225
  - Granite-block, Brooklyn Navy Yard, *181
  - Gravel, Construction and maintenance. By S. P. Hooker, 580
  - Illinois road law, 106; By W. R. Robinson, 376
  - Inspection by members of the National Association of Paving Brick Manufacturers, 338
  - International Road Congress, London, 1913, 57
  - Inventory of streets of Borough of Richmond, New York City, by five survey parties. By G. W. N. Hallock, *643
  - Iowa, New law, 36; Comment, 31
  - Lessons from the International Road Congress. By W. D. Sohier, 405
  - Macadam:
    - Selection of materials. By L. W. Page, 377
    - Surface used as base for new brick or asphaltic-concrete road, Allegheny County, Pa., 601
    - Treatment of wornout and raveled. By E. A. Stevens, 409; R. C. Terrell, 410
  - Maintenance:
    - Economics of. Analytical discussion. By L. I. Hewes, 77
    - Sub-organization for. By J. N. Carlisle, 672
  - Massachusetts traffic census for 1912, 612
  - Merit system in road management. By J. T. Doyle, 380
  - Mixing plant, Semi-portable bituminous, Springfield, Mass., *212
  - Motor traffic receipts in Pennsylvania, 652
  - National aid, 254. By D. F. Houston, 407; S. P. Hooker, 672
  - National-aid highway bill, Shackelford, 596
  - National Highway Association, Grasping propaganda of, 169, 254; By C. H. Davis, c335
  - New York City:
    - Inventory methods and costs by five survey parties. By G. W. N. Hallock, *643
    - Opening of streets, Regulation, 198
    - Riverside Drive, Three inches of asphaltic concrete, 479
    - Type and location of pavements, 427
  - New York State:
    - Blackmailing of contractors, 621
    - Cube pavements of Monroe County. Service tests and costs of material since 1908. By W. G. Harger, *624; Comment, 621
    - Excavation, Use of hammer drills operated by compressed air, 137
    - Fillers, Recommendations of Department of Efficiency and Economy, 680
    - Legal, financial and engineering considerations in expending $100,000,000 for roads. By G. A. Ricker, 388
    - Maintenance, Sub-organization for. By J. N. Carlisle, 672
    - Report on reorganization of the Highway Department, by G. C. Diehl, Harold Parker and Col. W. deH. Washington, 543
    - Rules governing use of heavy vehicles, 471
  - North Carolina, Sand-clay road maintenance. By Leonard Tufts, 627

*Illustrated articles; c, correspondence.

Roads and pavements: (Continued)
  Office of Public Roads, Work of, for 1912-1913. Report of L. W. Page, 689
  Oiling, Maryland, 205
  Oiling macadam, Cost, Madison, Wis., 470
  Ontario, Canada. Report on roads of Essex County, 609
  Opening of streets, Regulation, New York City, 198
  Pennsylvania:
    Indictment of state highway officials for bad roads, 311
    Progress on state highways. Work accomplished under Sproul Act of 1911. Notes on organization, instruction and maintenance, 652
  Permanent and impermanent elements of roads, 338
  Philadelphia:
    Experimental section of different materials on Byberry and Bensalem Turnpike, *628
    Work of Bureau of Highways and Street Cleaning in 1913, 632
  Philippine Islands. By H. F. Cameron, *172; Comment, 169
    Experiences with native labor and use of coral building material. By D. E. Henry, 641
    Piecework system of construction, 82
    Surface-oiled roads, 303
  Purchasing of materials and equipments, Maryland system. By H. G. Shirley, 410
  Realignment, grading and drainage. By S. D. Foster, 672
  Rock asphalt, San Antonio, Tex., *214
  Rules governing use of heavy vehicles, Allegheny County, Pa., 494; By D. T. Pierce, c532
  San Antonio, Tex., Rock asphalt, *214
  South Carolina, Sand-clay road maintenance. By Leonard Tufts, 627
  Suggestions for city engineers, 352
  Tars, Analytical composition of America and British. By W. W. Crosby, 703
  Testing machine, English, 403
  Testing road materials. By Prevost Hubbard, 700
  Tests of materials by U. S. Department of Agriculture. Page impact test for toughness, Deval abrasion test. Dorry hardness test. By L. W. Page, 101
  Track construction and desirable pavements, Experience of Connecticut Co., *552
  Tractive resistance measured by dynamometer wagon, Tests in Washington, D. C., *631
  Traffic stresses, Analysis of. By E. A. Stevens, 432
  Unit price, lump sum and percentage work. By H. C. Hill, 700
  Unsurfaced roads. By W. S. Keller, 378
  Washington, D. C., Chevy Chase Road, Expansion and contraction measurement of concrete. By A. T. Goldbeck, *76
  Wayne County, Mich.:
    Eighty miles of concrete roads built principally by day labor, *340; Comment, 338. By F. F. Rogers, 409
    Report of Road Commissioners unsatisfactory, 536
  Winona County, Minn., 8-foot concrete roads with 4-foot crushed limestone shoulders, *159; Comment, 141
  Wisconsin, State aid for, 577
  Wood-block on steep grades. Noiseless driveway entrance to New York apartment house, 586
  (See also Street cleaning)
Rochester, N. Y., Railway station, New York Central Road. Steel roof trusses, *666
Rock Island Arsenal, Water purification plant, *609
Rockford, Ill., Water tanks, Reinforced-concrete, *132
Roof trusses:
  Long-span rolling mill, Republic Iron & Steel Co., Youngstown, Ohio, *164
  Steel, Railway station at Rochester, N. Y., *666

S

Sacramento, Ca., Sewage flow and variations, Measuring. Use of differential mercury gage, *191
Sacramento Valley, Flood control. By T. G. Dabney, c251
Safety medals awarded by American Museum of Safety, 679
St. Louis, Mo., Sewer, Collapse of brick, causing cave-in of street, *417
St. Maries, Idaho, Bridge over St. Joseph River. Low-cost drawbridge, *69
St. Paul, Minn., Concrete towers, Self-supporting, and novel chute supports in crowded street, *235
Salt Lake City, Utah, Concrete plant for capitol building, *526
San Antonio, Tex.:
  Culvert and street crossing, Concrete, *148
  Paving with rock-asphalt, *214
San Diego, Cal.:
  Panama-California Exposition, Progress of, *555
  Water meters, Handling of. By H. L. Worthen, 526
  Water-works, Rapid pump and pipeline installation, *179; Comment, 169
San Francisco, Cal.:
  Buildings:
    Machinery Hall of Exposition, Large timber structure, *237; Comment, 225
    Moving 8000-ton school building, *581
    Moving residence through streets without blocking traffic, *612
  Concrete walls, Breaking up of, *546
  Contracts, Bonus and penalty form, 254
  Dam, Sunol, Test of flow over model. By J. N. LeConte, *193
  Dock construction, Casting concrete piers in the dry within steel caissons, *633
  Dock failure at Green Street, 563
  Harbor improvements. Plans of State Harbor Board for handling increased shipping after opening of Panama Canal. By F. G. White, *49
  Refuse disposal, Islais Creek incinerator plant. Special devices, *177
  Smoke nuisance, Investigation of, 75
  Water-pipe testing in trench, Device for, *531
  Water supply for fire protection:
    Combination of cisterns and high-pressure pumping system drawing water from the bay and from reservoirs. By A. J. Cleary, *107; Comment, 85
    Formulæ for weights of cast tees and crosses, *236
    Pipe joint tests. By A. J. Cleary, *119
  Water supply, Hetch-Hetchy scheme:
    Bill passes the Senate, 649
    Bill signed by President, 708
    Discussion, 113. By E. N. Bryan, c224
    Erroneous statements regarding the project, 282
Santa Cruz Valley, Ariz., Irrigation of. Recovery of underground water by wells and pumps. By M. C. Hinderlider, *200, *242; A. L. Collins, c476, c*589
Scale-testing car of the Bureau of Standards. By A. H. Emery, Jr., *460
Scales, Testing of large, by Bureau of Standards, 102
Schools. (See Education; Engineering education)
Scow for submarine rock drilling in East River, New York City, between North and South Brothers Islands, *600
Sea defenses. (See Retaining walls)
Seattle, Wash.:
  Electrolysis of water pipes, 706
  Harbor development. By W. L. Kidston, *221
Settling basins. (See Water purification)
Sewage flow, Measuring, Sacramento, Cal., *191
Sewage treatment:
  Columbus, Ohio, Remodeling of tanks and filters, 64
Sewage treatment: (Continued)
  European methods, Report on, to Philadelphia. By G. E. Datesman, 386
  Great Britain, Appendix to Royal Commission's eighth report on sewage disposal, 315
  Imhoff tanks:
    Design. By L. C. Frank and Franz Fries, *452, *501, *519; Comment, 449
    Selection of preliminary screens and proportioning of grit chambers. By L. C. Frank and Franz Fries, *452; Comment, 449
    Sinking, as open caissons. By E. B. Van de Greyn, *432; Kenneth Allen, c533
    Size for sludge storage compartment. Depth as a factor in sludge digestion. Pumping sludge and drying beds. By L. C. Frank and Franz Fries, *519
    Sludge distribution. By Charles Hoopes, *429
    Sludge, Fresh and decomposed. Difference in chemical composition. Utilization possibilities. By H. Bach and L. C. Frank, *331; E. Kuichling, c418; Rudolph Hering, c420; C. W. Hendrick, c420
    Suggestions for settling compartments, velocity of flow, detention period and scum boards and baffles. By L. C. Frank and Franz Fries, *501
  New Jersey plants, Tabulation by R. B. Fitz-Randolph, 470
  Oldham, England, Sludge disposal by Grossmann process, 74
  Philadelphia, Pennypacker Creek works. Apparatus and operating results. By W. L. Stevenson, *256
  Shellfish conservation and sewage disposal. By G. A. Johnson, 294
  Sludge disposal, Oldham, England, Grossmann process, 74
  Sludge distribution in settling tanks. Plan of the Imhoff tank. By Charles Hoopes, *429
  Sludge, Fresh and decomposed. Experiments in Germany to determine the difference in chemical composition of sludge from Imhoff tanks. Utilization possibilities. By Hermann Bach and L. C. Frank, *331; E. Kuichling, c418; Rudolph Hering, c420; C. W. Hendrick, c420
  Travelers for distribution of sewage, Springfield, Mo. By Alexander Potter, *440; Comment, 421
  Uniformity in works. Regulations of New Jersey State Board of Health, 273; Comment, 253
Sewer pipe. (See Pipe)
Sewerage, Vancouver, B. C. Report by R. S. Lea. Organizing and financing project for draining 55,600 acres, with data on rainfall and float tests of dispersion at outfalls, *472; Comment, 449
Sewers:
  Cedar Rapids, Iowa. Constructing brick storm sewer, *304
  Cleaning costs, Hamilton, Ohio, 354
  Comparison, Hydraulic, of egg-shaped and circular. By O. L. Eltinge and R. S. Beard, c*112
  Dayton, Ohio, Effects of flood. Damage and repair work. By G. C. Cummin, *357
  Eugene, Oregon, Completion, 676
  Launching submerged outfall, Ocean Grove, N. J. By M. R. Pugh, *279
  New York, White Plains Avenue sewer completed, 527
  Peoria, Ill., Design of system, 535
  St. Louis, Mo., Collapse of brick sewer causing cave-in of street, *417
  Separate and combined. By J. H. Gregory, 442
  Suggestion for city engineers. By H. N. Ruttan, 352
  Uniformity in sewer plans. Regulations of New Jersey State Board of Health, 273; Comment, 253
Sheffield, England, Municipal control of city planning. By C. F. Wike, 175
Shellfish conservation and sewage disposal. By G. A. Johnson, 294
Sherman law and agreements between engineers not to enter competitions. By D. B. Luten, c335
Shields, Tunneling, Subway construction, New York City, *147
Ships:
  Diesel-electric drive for, 282
  Electricity on "Jupiter," Trial off Santa Barbara, Cal., 664
  Oil fuel, Use of. By C. Zulver, L. R. Freeman; Comments, 423
Signals:
  Automatic stop competition of New York, New Haven & Hartford R. R., 252
  Colored danger signals in industrial plants. Blue-yellow signals advocated by Dr. F. D. Patterson, 487
Siphons:
  Antelope Valley, Los Angeles aqueduct. By W. W. Hurlbut, *60
  Catskill aqueduct, across the Narrows, New York harbor. By A. D. Flinn, *317; Comment, 309
  Jawbone, Los Angeles aqueduct, Designing for minimum weight of metal consistent with safety. By E. R. Bowen, *682
  Medina irrigation project, San Antonio, Texas, Reinforced-concrete, *424
Sludge. (See Sewage treatment)
Sluicing sand and gravel in steel-lined flumes, Tacoma, Wash., *702
Smoke prevention:
  New York City, 86
  Pittsburg, Pa., Report by John J. O'Connor, 540
Spokane, Wash., Bridge floor of hollow, concrete-tile, *647
Springfield, Mass., Road construction, Semi-portable bituminous mixing plant, 212
Springfield, Mo., Sewage distribution with travelers. By Alexander Potter, *440; Comment, 421
Sprinkler system. (See Fire protection)
Stacks. (See Chimneys)
Standardization:
  Utilizing standard equipment, 30
  Work of Bureau of Standards, 592
Steam-shovel work, Unit costs on, 320
Steel industry, Extent of, 269
Steel mill buildings. (See Buildings)
Sterilization of water. (See Water purification)
Stone, Synthetic, Advantages and possibilities, 395
Storing lime. (See Lime)
Strain gage in testing materials, Use of. By W. A. Slater and H. F. Moore, *132
Stream flow investigations in New York State, 436
Street accidents and traffic regulations in London, 367
Street cave-in opposite Marshall Field building, Chicago, *677
Street cleaning:
  Automobile flusher and sprinkler, Chicago, *602
  Chicago, Report on a constructive investigation, 558
  Dayton, Ohio, *358
  New York City, Report of commissioner W. H. Edwards for 1912, 427
  Progress. By S. Whinery, 295
  Washington, D. C.:
    Cost system. By J. W. Paxton, 296
    Hand patrol, machine-broom cleaning, squeegees and flushing. By J. W. Paxton, 353
    Municipal versus contract system. By J. W. Paxton, 296
Street crossing, Concrete, San Antonio, Texas, *148
Street-lighting, Boston, Appropriation for gas lighting need not be spent, 1
Stresses in circular tubes. By W. Poulsen, c25; C. W. L. Filkins, B. Haukelid, c251, c676; J. H. Gregory, c307; O. G. Welton, c674
Strike losses, Reparation for, Pennsylvania, R. R., 1
Strikes, Winning "from within," Paterson, N. J., 1
Subways. (See names of cities)
Surge tank, San Francisquito power station, Los Angeles aqueduct, *299; Comment, 281. By R. D. Johnson, c420, c733; Correction, 644; W. F. Durand, c733

*Illustrated articles; c, correspondence.

- Surveys and surveying:
  - Angles, Allowable use of small. By W. H. Raynor, *439
  - Asia Minor, Plane-table survey. Experiences in mountain work with sidelights on the people and the country. By L. T. Emory, *437
  - Bench mark, Frost-proof, *646
  - Black River canal, New York, Report by L. A. Burns, 1912, *157
  - Canada, Methods and compensation. By J. A. Macdonald, 156
- Symbols. (See Engineering notation)

T

- Tackle block for a 15-part 100-ton tackle, Terry & Tench, *521
- Tacoma, Wash., Sluicing sand and gravel in steel-lined flumes, *702
- Tars for roads, Analysis of American and British. By W. W. Crosby, 703
- Terminals. (See Railway terminals)
- Testing materials, Use of strain gage, Berry type and Howard type. By W. A. Slater and H. F. Moore, *132
- Thermophones for temperature measurement in Kensico dam, Valhalla, N. Y., *119
- Ties:
  - Preservation. (See Timber preservation)
  - Statistics for 1911, 182
- Timber:
  - Bending strength of yellow pine. By A. T. North, c27
  - Life of untreated, Methods of lengthening suggested by American Railway Bridge and Building Association, 542
  - Sale of national, 47
- Timber preservation:
  - Creosoted wood blocks for factory and warehouse floors. By F. A. Weaver, 185
  - Structural timber. Report of American Railway and Building Association, 678
  - Ties treated in 1911, Government statistics, 182
- Title-page honesty, 621
- Toledo, Ohio, Bridge, Cherry Street bascule, Trolley-wire slack distributor, 577
- Towers, Analysis of steel. Determination of action of wind loads and design of tower bents. By Isidore Delson, *302
- Town planning. (See Cities)
- Track construction:
  - Louisville & Nashville R. R., Company-force work, *162; Comment, 141
  - Supporting tracks under traffic during construction, *552
- Track elevation at Piqua, Ohio, *547
- Trade schools. (See Education)
- Transmission lines:
  - Aeroplane for patrolling lines, Great Western Power Co., San Francisco, 663
  - Structural progress, 537
- Transportation and city planning. By M. R. Maltbie, 65; Comment, 58
- Transportation of mail, express or package freight by electric carrier running in cylindrical tube. Demonstrating plant at Paterson, N. J., *387
- Travelers for sewage distribution, Springfield, Mo. By Alexander Potter, *440; Comment, 421
- Trestles. (See Bridges, trestles and viaducts)
- Troy, N. Y., Railway station depressed concourse. By J. R. Taft, *691
- Trucks, Motor. (See Motor trucks)
- Tubes. (See Tunnels and tunneling)
- Tunnels and tunneling:
  - Accidents, Precautions against. By Maurice Deutsch, c56
  - Astoria, New York City, Consolidated Gas Co., Completion, *95
  - Blount. (See below, Louisville & Nashville R. R.)
  - Buenos Aires subway construction. By F. Lavis, *613
  - Canadian Pacific R. R., Multiple-entry method of tunneling proposed, 470
  - Catskill aqueduct, in New York City. By W. E. Spear, 333
  - Coast Range, Noti, Ore. Willamette Pacific Line opening, 363
- Tunnels and tunneling: (Continued)
  - Cost of tunnels per lineal foot, 510
  - Detroit River, Credit for plan, 490
  - Driving problems. Influence of size and length of bore on progress and costs. Driving methods. Ventilation and refrigeration. Ground pressure and lining. By E. Lauchli, *510
  - English Channel, 230, 449. By C. O. Burge, *499
  - European tunnel sections for single and double-track traffic, *510
  - Harlem River. (See New York City, Lexington Avenue subway)
  - Hayden. (See below, Louisville & Nashville R. R.)
  - Lining, Self-supporting reinforced-concrete segmental blocks, Mount Royal tunnel, Canadian Northern Ry., *149
  - Los Angeles aqueduct, Records of tunnel work and costs. By W. W. Hurlbut, 485
  - Louisville & Nashville R. R., Blount and Hayden Mountain, *232
  - Mount Royal, Canadian Northern Ry., Lining of reinforced-concrete segmental blocks which are self-supporting, designed by J. F. O'Rourke, *149
  - Pine Mountain, Ga., Converting to an open cut, *208
  - Roof shields and pilot girders in tunneling through fine sand, Lexington Avenue subway, New York City, *147; Comment, 141
  - Safety in tunneling discussed in circular of U. S. Bureau of Mines, 632
  - South Africa, Longest tunnel, the Stockton, 126
  - Stresses in circular tubes. By W. Poulsen, c25; C. W. L. Filkins, B. Haukelid, c251, c676; J. H. Gregory, c307; O. G. Welton, c674
  - Submerged tubes, Floating and sinking the Harlem River section of the New York subway, *284, 300; Comment, 281, 372
  - Switzerland, Notes, 247
  - Ventilation statistics for six long, deep tunnels, 512
- Turbines, Hydraulic:
  - Cedar Rapids plant, *461; Comment, 450
  - Niagara Falls Power Co. Ten 5500-hp. wheels with 54-inch runners and cylinder gate speed control, *443; Comment, 421
  - Pelton, Governor for, in Swiss plant, *186
  - Tests of low-head turbines at Elkhart, Ind., Indiana & Michigan Electric Co., 678
- Typhoid fever, Philadelphia. Relation to water supply. By J. A. Vogleson, 290

U

- Uhrichsville, Ohio, Novel bridge repair job. By Edward Stingel, *53
- Ultra-violet light for water sterilization. (See Water purification)
- Underpinning. (See Buildings)

V

- Valuation of garbage plant. (See Refuse disposal, Chicago)
- Valuation of railroads. (See Railways, Valuation)
- Valves:
  - Brake arrangement for flap valves for closing penstocks under high heads, Norwegian, *105
  - Butterfly gates, San Francisquito power station, Los Angeles aqueduct, *327
  - Independent power for operating power plant, 535
- Vancouver, B. C.:
  - Flagpole 208 feet in length, Erection of, *356
  - Pipe, Hauling submerged, with steam winch, *263
  - Sewerage, Report by R. S. Lea. Organizing and financing project for draining 55,600 acres, with data on rainfall and float tests of dispersion at outfalls, *472; Comment, 449
  - Water pipe, Life of riveted steel, 521
- Ventilation, Recirculated air, Experiments in Minneapolis schoolroom. By Frederick Bass, 87
- Viaducts. (See Bridges, trestles and viaducts)

W

- Wagon, Dynamometer for road resistance tests, *631
- Wall footings, Reinforced-concrete, Tests at University of Illinois, 126
- Warehouse floors (See Floors)
- Washington, D. C.:
  - Chevy Chase Road, Expansion and contraction measurements of concrete. By A. T. Goldbeck, *76
  - Street cleaning:
    - Cost system. By J. W. Paxton, 296
    - Hand-patrol, machine-broom cleaning, squeegees and flushing. By J. W. Paxton, 353
    - Municipal versus contract. By J. W. Paxton, 296
- Water, Pure and wholesome, Difficulty in determining. By G. A. Johnson, 139
- Water analysis, Value of routine, in sanitary surveys. By H. E. Barnard, 297
- Water consumption in Boston, 92
- Water evaporation tests, Hand and raft equipment for, designed by E. H. Kriegsman, *498
- Water mains (See Pipe)
- Water meters:
  - Handling of, San Diego, Cal. By H. L. Worthen, 526
  - Maintenance of, and effect on revenue. By A. W. Cuddeback, 290
- Water pipe (See Pipe)
- Water pollution:
  - Bacterial counts, 20 and 37 degree. By J. B. Thomas and E. A. Sandman, 295
  - Chemical character of water of rivers and streams. Appendix to eighth report of the Royal Commission on sewage disposal of Great Britain, 315
  - Methylene-blue putrescibility test, Fallacy of. By Arthur Lederer, 295
  - Niagara River. Preliminary report of investigation by International Joint Commission, 373
- Water power:
  - British Columbuia, Proposed report, 195
  - Congressional committee recommendations adopted by National Conservation Congress, 601; Comment, 593
  - New York State, Right of eminent domain discussed by Arthur J. Baldwin, 517. By Clemens Herschel, c704
  - Oregon, Federal aid, 557
  - Pend d'Oreille River, Federal permit for development, 145; Comment, 142
  - Wisconsin law, Proposed, 59
- Waterproofing of concrete. Report at American Society for Testing Materials, 39; Comment, 29
- Water purification:
  - Albany, N. Y., Costs, 70
  - Abuse of plants. Plea for more efficient operation. By H. P. Letton, 719
  - Albany, Oregon, "Tuning up" filters and training attendants, 553
  - Baltimore, Md., Failure of groined reservoir arches. Report by John H. Gregory. By J. W. Armstrong, *538
  - Chemical feeder, Automatic. Test at University of Illinois, *264; By Ralph Hilscher, c364
  - Cherryvale, Kan., *261
  - Clarksburg, W. Va., Mechanical filtration. Details of design, results of operation and cost of filtered water. By H. W. Streeter, *7
  - Decarbonation, to remove corrosive properties. By G. C. Whipple, 213
  - Decolorization and water softening. By W. A. Sperry, 294
  - Design of plants. Regulations of New Jersey State Board of Health, 300
  - Dry-feed apparatus for chemicals. By Allen Hazen, *71
- Water purification: (Continued)
  - Evanston, Ill., Rapid filter plant for Lake Michigan water. Ridge-block underdrainage system. 12,000,000-gallon plant. By Langdon Pearse, *578
  - Filter operation committee, New England Waterworks Association, 309
  - Filter patent decision in favor of New York Continental Jewell Filtration Co., 287
  - Fort Smith, Ark., Break of baffle wall in settling basin, *619
  - Harrisburg, Pa.:
    - Filter patent decision of New York Continental Jewell Filtration Co., 287
    - Operating expenses, 120
  - Lime for water softening, Storing of. Storage bins and weighing apparatus, delivery in bulk and elimination of troubles from air slaking. By C. P. Hoover and C. J. Clarke, *9
  - Lime sterilization. Research work at Columbus, Ohio. By C. P. Hoover and R. D. Scott, 257
  - Louisville Ky.:
    - Micro-organism troubles and how they were remedied. By F. H. Stover, 100; W. H. Lovejoy, c112
    - Mud removal, 69
  - Moline, Ill.;
    - Condtion of wash water in mechanical filters. By L. A. Fritze, *430
    - Micro-organisms in water. By L. A. Fritze, c56
  - Montreal. Frost damage to filters. Repair methods and report by board of experts. By F. E. Field, *566
  - Oxygen, Test for dissolved. Report of British Royal Commission on Sewage Disposal. By G. C. Whipple, 453
  - Pana, Ill. By A. C. Stanfield, *96
  - Philadelphia, Operation of Torresdale filter plant. By F. D. West, 290
  - Progress and limitations of sterilizing processes, 293
  - Putting small plants in operation, Necessity for skilled operators, 565
  - Report by American Public Health Association, 293
  - Rock Island Arsenal. Rapid filters purify Mississippi River water, *609
  - Softening of water. By W. A. Sperry, 294
  - Turbidity:
    - Adding artificial turbidity to water. Experiments by J. R. Davies, 699
    - Reading at night, Denver, *352
  - Ultra-violet ray apparatus for sterilization. "Pistol" light and its application. By von Recklinghausen, *121; Comment, 113
  - Wash water in mechanical filters, Study of, at Moline, Ill. By L. A. Fritze, *430
  - Wilmington, Del., Filtration costs, 180
- Water rights, Colorado dispute, Government favors arbitrating, 549
- Water supply:
  - Building, Woolworth, New York, 44; Comment, 29
  - Cherryvale, Kan., Supply from Verdigris River, *260
  - Cisterns, for fire protection, San Francisco, *107
  - Fire-protection service charges. Practice in the United States. By Leonard Metcalf, 51
  - New Jersey, Wharton tract scheme, Legality, 57
  - New York, Croton, Protection recommended by the Comptroller, 179
  - Philippine Islands, Artestian wells. By H. F. Cameron, *202
  - San Francisco, fire protection:
    - Combination of cisterns and pumps drawing water from the bay and reservoirs. By A. J. Cleary, *107; Comment, 85
    - Formulæ for weights of cast tees and crosses, *236
    - Pipe joint tests. By A. J. Cleary, *119
  - San Francisco, Hetch Hetchy scheme;
    - Bill passes, 649, 708
    - Discussion, 113; By E. N. Bryan, c224
    - Erroneous statements, 282
  - Stafford, Ariz., Conservation, 52

*Illustrated articles; **c**, correspondence.

- Water supply: (Continued)
  - Winnipeg, Man. Report on Shoal Lake supply by board of consulting engineers, 385
- Water tanks, Reinforced-concrete, Rockford, Ill., *132
- Water waste prevention:
  - New York City. By I. M. DeVarona, 11; 227
  - Pulsograph tests. By W. W. Brush, *289
  - Various cities, 85
  - Wilful waste. By W. E. Belcher, c476
- Watertown, N. Y., Black River canal. Report on surveys and estimates by L. A. Burns, *157
- Waterways (See Canals; Rivers)
- Water wheels (See Turbines)
- Waterworks:
  - Appraisal of property, Methods at Chillicothe, Ohio, 358
  - Cherryvale, Kan., Bringing water from Verdigris River, *260
  - Denver, Col., Legal decision, 3
- Waterworks: (Continued)
  - Designs for, Regulations of New Jersey State Board of Health, 300
  - Discussions at convention of New England Waterworks Association, *289
  - Economical development of, By F. H. Carter, 725
  - Los Angeles, Cal., Number of services on pipes of specified size, 94
  - Minneapolis, Minn., Turbine pumps, performance of. By E. P. Burch, 12
  - Pana, Ill., Extensions. By A. C. Stanfield, *96
  - Philippine Islands. By H. F. Cameron, *203
  - San Diego, Cal., Rapid pump and pipeline installation, *179; Comment, 169
- Weights and measures, Unification of, 709
- Weirs of Niagara River. Report by International Waterways Commission, *206
- Welland Ship Canal, Proposed. General features of the plan adopted, *35
- Wells, Drilling and cleaning, Santa Cruz Valley irrigation works. By M. C. Hinderlider, *201, *242
- Wharves and docks:
  - Boston, Commonwealth pier, 5. Pile foundations and steel shed, *275
  - Calculation of. Discussion of forces and loads. By Wolmar Fellenius, *325
  - Casting concrete piers in the dry within steel caissons, San Francisco, *633
  - Port organization and development. By A. G. Lyster, 570, 611
  - San Francisco:
    - Casting concrete piers in the dry within steel caissons, *633
    - Failure of Green Street dock, 563
    - Plans of State Harbor Board for improvements. By F. G. White, *49
  - Timber crib, Reconstruction, Erie, Pa., *152
- Wharves and Docks: (Continued)
  - White Star dock, Southampton, England, 685
- White River hydroelectric plant, General features, *135
- Wilmington, Del., Water filtration costs, 180
- Wind bracing of Woolworth Building, New York. By S. F. Holtzman, *22
- Windbreaks, Tree, along railway lines, to replace portable snow fences, *47
- Winnipeg, Man.:
  - Frost-proof bench mark, *646
  - Street-car operation on heavy grades in severe weather, 102
  - Water supply from Shoal Lake. Report by board of consulting engineers, 385
- Wisconsin public-utility law, Rates and rate-making under. By Halford Erickson, 42
- Wisconsin water-power law, Proposed, 59

AUTHOR INDEX

A

- Albert, K. A. How not to build a retaining wall, c*420, c504
- Allen, Kenneth. Why not sink Imhoff tanks as caissons? c533
- Alvord, J. W. (See Morgan, A. E.)
- Armstrong, A. H. Engineering problem of electrification, 716
- Armstrong, J. W. Failure of groined arches at Baltimore filtration plant, *538

B

- Babcock, A. H. Electrification for the Southern Pacific R. R., 314
- Bach, Hermann, and L. C. Frank. Fresh sludge and decomposed sludge, *331
- Bader, D. L. Forfeiture of certified check, c307
- Balcom, H. G. Engineering standards and architectural requirements, c166
- Baldwin, A. J. New York's water powers and the right of eminent domain, 517
- Barnard, H. E. Value of routine water analysis in sanitary surveys, 297
- Bayfield, H. A. Equipment and performance of the British Columbia dredging fleet, *209, c364
- Beard, R. S. To find the point of insection of two grades and vertical curves, c*734
  - (See also Eltinge, O. L.)
- Becker, D. N. How not to build a retaining wall, c561
- Belcher, W. E. Wilful water waste, c476
- Berg, E. V. Irrigation pumping plants, 53
- Blair, W. P. Observations on brick pavement, c561
- Blake, E. M. Dipper-dredge work on Neponset River, *551
- Boes, F. C. Valuation of steam railroads, c533
- Bond, P. S. Strength tests of bamboo, 582
- Bowen, E. R. Designing steel pipe for minimum weight of metal consistent with safety, *682
- Bowman, W. L. Legal suggestion respecting road contracts, 408
- Boyd, D. K. Method of checking economical height of office building, c589
- Bradt, S. E. Bond issues for road improvement, 380
- Brooks, Benjamin. Pond-week fallacy, c336
- Brush, W. W. Water-waste prevention in New York City, *289
- Bryan, E. N. Opposition to Hetch Hetchy water supply, c*224
- Burch, E. P. Performance of turbine pumps at Minneapolis, 12
- Burchartz, H. Determining proportions of concrete mixtures after hardening, 278
- Burge, C. O. Paving and road matters in England, c196
- Button, W. G. Limitations of mathematical theory, 518

C

- Caase, L. H. Proposed Mersey River suspension bridge, 387
- Cameron, H. F. Public works in the Philippine Islands under the American regime, *172, *202
- Carlisle, J. N. Sub-organization for maintenance of roads, 672
- Carter, F. H. Economical development of a water power, 725
- Case, A. M. Calculation of dock and bulkhead walls, c734
- Case, W. T. Prismoidal formulæ to suit special cases, c*140
- Chapman, C. M. Determining consistency of wet concrete, 52
  - Test for accuracy of cement sieves, c446
- Chase, G. H. Unfairness to the contractor, c166
- Church, I. P. Friction head in backwater problems, c*168
- Clarke, C. J. (See Hoover, C. P.)
- Cleary, A. J. Auxiliary water supply for the fire protection of San Francisco, *107
  - Tests of pipe joints, *119
- Cole, G. P. Railway electrification a conserver of natural resources, 686
- Coley, C. T. Method of checking economical height of office buildings, 21
- Collins, A. L. Irrigation of Santa Cruz Valley, c476, c*589
- Compton, R. K. Brick pavements in Baltimore, 436
- Comstock, A. F. Standard drafting table at the University of Illinois, *494
- Connor, M. A. Underpinning without needlebeams, c*392
- Conwell, E. L. Corrosion of metals, c280
- Cooke, M. L. Business methods in municipal works, 508
- Cooper, C. H. Traffic and wear of English highways, 638
- Cranford, F. L. Engineer, inspector and contractor, 700
- Cresson, B. F., Jr. Development of port facilities on New Jersey side of New York Bay, 525
- Crosby, W. W. American and British road tars, 703
  - Asphalt paving cements, c417
- Cuddeback, A. W. Maintenance of meters and effect on revenue, 290
- Cummin, G. C. Effects of flood on pavements and sewers, *357
- Cunningham, J. W. Fire damage to new Harriman bridge, Portland, Ore., c*224, c307
- Cushman, A. S. Study of available data on the autoclave test of cement, 14

D

- Dabney, A. L. Closure of Beulah levee crevasse, *4
- Dabney, T. G. Flood control in Sacramento Valley, c251
- Datesman, G. E. European sewage treatment methods, 386
  - Performance of direct explosion pumps in England, 412
- Davenport, G. L., Jr. Rating the efficiency of municipal employees, c26
- Davis, C. H. Federal aid for highways, c335
- Davis, Erwin. To find the point of intersection of two grades, c*84
- Delson, Isidore. Analysis of steel towers, *302
- Deutsch, Maurice. Precautions in tunneling, c56
- De Varona, I. M. Prevention of water waste in New York, 11
- Dingman, C. F. Clauses in contracts, c280
  - Unfairness to the contractor, c476
- Doll, M. G. Construction of Arrowrock dam, *265
- Donovan, J. J. Modern bunk house in lumber camp, 499
- Doyle, J. T. Merit system in road management, 380
- Drane, W. H. Code of ethics of the Pacific Northwest Society of Engineers, c112
  - Value of the classics in modern education, c251
- Duffee, L. W. Logging engineering, c706
- Dufour, F. O. Experiments on moving loads on highway bridges, 165
- Duke, C. S. Drilling as a test for concrete, *670
- Durand, W. F. Surge tank at San Francisquito power station, c733
- Dyche, L. L. Pond-week fallacy, c418

E

- Edwards, C. B. Pumping water against pressure of 2250 pounds, *690
- Edwards, W. H. Day and night collection of municipal wastes, 296
- Ellis, F. E. Contractor, engineer and inspector, 724
- Ellms, J. W. Flood and rainfall during March and April at Cincinnati, *48
- Eltinge, O. L., and R. S. Beard. Comparison of egg-shaped and circular sewers, c*112
- Emery, A. H., Jr. Scale-testing car of the Bureau of Standards, *460
- Emory, L. T. Plane-table survey in Asia Minor, *437
- Enright, Bernard. Test for accuracy of cement sieves, c446
- Erickson, Halford. Rates and rate-making under Wisconsin public-utility law, 42

F

- Ferguson, L. R. Contradictory figures in tests of cement by autoclave method, 18
- Field, F. E. Frost damage to Montreal filters, *566
- Filkins, C. W. L. Stresses in circular tubes, c251
- Fitzgerald, P. S. Highway improvements in North Alabama, 626
- Fleming, R. Design of steel mill buildings, 467, 491
- Fletcher, A. B. California's highway system, 379
- Flinn, A. D. Cracking of bronzes and brasses, 527
  - Narrows siphon of the Catskill aqueduct, *317
- Force, H. J. Results obtained with the autoclave test for cement, 13
- Foster, S. D. Bituminous construction, 379
  - Realignment, grading and drainage of roads, 672
- Frank, L. C. (See Bach, Hermann)
- Frank, L. C., and Franz Fries. Design of Imhoff sewage plants, *452, *501, *519
- Fritze, L. A. Condition of wash water in mechanical filters, *430
  - Micro-organisms in water, c56
- Fuller, W. E. Loss of head in pipe bends, *381

G

- Gandolfo, J. H. A question of stability, c*223
- Gardner, H. A. Powerful influence of basic pigments in protecting metals from corrosion, 93, *insert
- Gayler, Carl. Collapse of concrete building at Cedar Rapids, Iowa, c705
- Gearhart, W. S. Pond-week fallacy, c418
- Gelder, R. W. How not to build a retaining wall, c*561
- Gibb, A. S. Causes of inefficiency of irrigation, 608
- Gibson, J. E. Comparative economy of producer gas and steam for pumping stations, 262, c392
- Gibson, W. L. Highest railways in the world, c420
- Godfrey, Edward. Designing concrete slab spans for railroad bridge, c533
- Goldbeck, A. T. Expansion and contraction measurement of concrete roadways, *76
  - Tests of reinforced-concrete slabs, 154
- Goss, W. F. M. Efficiency in technical education, 658
- Gradenwitz, Alfred. Iron and steel railway bridge in German Cameroon, *134
- Gregory, J. H. Separate and combined sewers, 442
  - Stresses in circular tubes, c307

H

- Hall, J. E. Rock drilling in Tennessee River, 488
- Hall, S. R. Blasting experience, c506
- Hallock, G. W. N. Methods and cost of pavement valuation, *643
- Harger, W. G. Small cube pavements of Monroe County, New York, *624
- Harris, A. L. Overflow dam in service five years, *541
- Haukelid, Bjorgulf. Stresses in circular tubes, c251, c676
- Hazen, Allen. Dry feed for chemicals used in water purification, *71
- Henderson, R. M. Organization of an engineering construction company, 187
- Hendrick, C. W. Fresh and decomposed sludge, c418

Henry, D. E. Highway construction in the Philippines, 641
Hering, Rudolph. Fresh and decomposed sludge, c418
Herschel, Clemens. New York's water power and the right of eminent domain, c704
Hill, H. C. Unit price, lump sum and percentage work on roads, 700
Hill, L. C. Elephant Butte dam construction, *368
Hillberg, A. G. Design of rolling dams, *654
Hilscher, Ralph. Automatic chemical feeder, c364
Hinderlider, M. C. Irrigation of Santa Cruz Valley, *200, *242
Hirst, A. R. Waterway structures for roads, 378
Holt, J. B. Engineer's change of location and its effect, c307
Holtzman, S. F. Design of the Woolworth Building, *22
Hooker, D. E. Dry rot in floors, c26
Hooker, H. M. Composition floor, 635
Hooker, S. P. Construction and maintenance of gravel roads, 580
  Program for administering Federal aid for road improvement, 672
Hoopes, Charles. Distribution of sewage sludge in settling tanks, *429
Hoover, C. P., and C. J. Clarke. Storing lime for water softening, *9
Hoover, C. P., and R. D. Scott. Lime sterilization of water, 257
Hopson, E. G. State and federal cooperation in irrigation work, 685
Horton, A. H., and H. J. Jackson. Flood losses in the Ohio Valley in March-April, 1913, 439
Horton, R. E. Flood frequency and flood control, c505
Houston, D. F. Federal aid in road construction, 407
Howard, C. P. Factors entering into grade reductions, 375
Howard, J. W. Asphalt paving cements and road binders, 345
Hoxie, F. J. Location leaks in water mains, *291
Hubbard, Prevost. Testing road materials, 700
Hudson, J. I. Flood wall of Portsmouth, Ohio, *712
Hurd, E. C. The engineer-commissioner, c504
  Valuation of steam railroad, c111
Hurlbut, W. W. Antelope Valley siphon, Los Angeles aqueduct, *60
  Completion of Los Angeles aqueduct, *482

J

Jackson, J. A. Code of ethics of the Pacific Northwest Society of Engineers, c166
Jensen, J. N. Effect of hot lard on concrete, 602
Jenson, Joseph. Methods of building cut-off wall, *522
Johnson, A. N. Concrete roads, 471
Johnson, C. H. Wearing qualities of concrete floor surface, c111
Johnson, G. A. Pure and wholesome water, 139
  Shellfish conservation and sewage disposal, 294
Johnson, R. D. Large tank at San Francisquito power station, c420, c733
Jollyman, J. P. South Yuba-Bear River power development, *573

K

Kastenhuber, E. G., Jr. Licensing of engineers, c26
Keller, W. S. Unsurfaced roads, 378
Kidston, W. L. Harbor development in Seattle, *221
Kimball, G. H. Unification of Buffalo freight terminals, 414, *431
King, W. D. Discretionary clauses in contracts, c308
Klein, Samuel. Graphical analysis of double-reinforced-concrete sections, c*252
Kleinschmidt, H. S. Variation in level of Great Salt Lake, c84
Koon, S. G. Fire disasters and automatic sprinklers, c336
Kriegsman, E. F. Diagram of cost of retaining walls, *157
Kuichling, E. Fresh and decomposed sludge, c418

L

Lasier, E. L. Comparison of column formulæ, 41
Lauchli, E. Problems in driving long and deeply overlaid tunnels, *510
Lavis, E. Railways and subways at Buenos Aires, *613
Lea, R. S. Report on Vancouver sewerage scheme, *472
Lechler, B. C. Forfeiture of certified check, c446
LeConte, J. N. Flow over model of Sunol dam, *193
Lederer, Arthur. A fallacy of the methylene-blue putrescibility test, 295
Lee, T. B. Extra top width for new railroad embankments, c589
  Proposed test for accuracy of cement sieves, c533
Letton, H. P. Abuse of water purification plants, 719
Libberton, J. H. Handling cement in bulk, *63
Logan, K. H. (See McCollum, Burton)
Lovejoy, W. H. Micro-organisms in water, c112
Luten, D. B. Sherman law and agreements between engineers not to enter competitions, c335
Lyster, A. G. Port organization and development, 570, 611

M

McBride, R. S. (See Rosa, E. B.)
McCleary, J. M. Brick road construction, 407
McCollum, Burton, and K. H. Logan. Electrolytic corrosion of iron in soils, 34
McCullough, Ernest. Sherman Law and agreements between engineers not to enter competitions, c590
Macdonald, J. A. Dominion land surveys, 156
McKibben, F. P. Industrial education in Berne, Switzerland, 164
Maltbie, M. R. Transportation and city planning, 65
Marsh, F. B. Wire-cut lug paving blocks, *37
Marston, D. A., and A. O. Anderson. Strength of drain tile and sewer pipe, 46
Mayhew, A. B. Construction camp at Arrowrock dam, 116
Meade, R. K. Experiments on the action of various substances on cement mortars, 20
Metcalf, Leonard. Private fire-protection service charges, 51
Miller, H. A. New cyclopean masonry dam at Pittsfield, 291
Modjeski, Ralph. Design of large bridges with special reference to Quebec Bridge, *321, insert, *354, *383
Moore, H. F. (See Slater, W. A.)
Moore, L. E. How not to build a retaining wall, *324, c420, c504
Morgan, A. E., and J. W. Alvord. Flood-prevention investigation in Ohio, 38
Moritz, E. A. Flow of water in pipes, *667
Muchemore, H. L. Making building inspectors by fiat, c140

N

Near, N. G. A Mexican labor experience, c307
Newell, C. A. Growth of the cement industry on the Pacific Coast, 474
North, A. T. Bending strength of yellow-pine timber, c27
Norton, J. F. Ozone as a room disinfectant, c732

O

Oakes, J. C. Failure of cofferdam at Ohio River lock and dam No. 48, 120
O'Hearne, James. A college course in logging engineering, 549
Overstreet, R. M. White Salmon River power development, *396
Owen, Ernest. Simple beam and column formulæ, c676
Owens, J. S., and F. J. Wood. Reinforced-concrete sea defenses in England, 240

P

Page, L. W. Highway bridge specifications, 230, c392
  Selection of materials for macadam roads, 377
  Tests of road building rocks, 101
Paul, C. H. Rolling dam of the Boise project, *125
Paxton, J. W. Cleaning streets in Washington, D. C., 353
  Cost system for street cleaning in Washington, 296
  Municipal versus contract street cleaning in Washington, 296
Pearse, Langdon. Water purification at Evanston, Ill., *578
Pierce, D. T. Rules governing use of heavy vehicles on highways, c532
Pope, C. S. Cost of concrete base for pavements in Los Angeles, 637
Potter, Alexander. Muskogee concrete reservoir, *616
  Travelers for sewage distribution, *440
Poulsen, W. Stresses in circular tubes, c25
Pratt, J. H. Convict labor in road construction, 701
Pugh, M. R. Launching a submerged sewer outfall, *279
Pullar, H. B. Asphalt paving cements and road binders, c534
Pulver, H. E. Effect of salts on strength of concrete, 466

R

Rayner, W. H. Allowable use of small angles in surveying, *439
Reibling, W. C. Bonus system for the purchase of Portland cement, 215
Reinke, W. B. Proposed test of sand for concrete, 202
Rice, G. S. Methods of preventing land slides, 76
Ricker, G. A. Highways of New York state, 388
Roark, R. J. Strength of outstanding flanges in beams and columns, *722
Roberts, G. H. Engineering research and its co-ordination, 226
Robinson, E. W. Data on earth excavation, 634
Robinson, W. R. Choosing highway superintendents under new Illinois law, 376
Rogers, F. F. Concrete roads, 409
Rosa, E. B. Cracking of bronzes and brasses, 528
  Test for accuracy of cement sieves, c446
Rosa, E. B., and R. S. McBride. Legal specifications for illuminating gas, 171
Ruttan, H. N. Suggestion for city engineers, 352

S

Sandman, E. A. (See Thomas, J. B.)
Schaphorst, W. F. Forfeiture of contract bond, c364
Schuyler, Mont. Observations on brick pavements and the rattler test, c447
  Testing drain tile and sewer pipe, *695
Scott, R. D. (See Hoover, C. P.)
Shamberger, J. P. Location of neutral axis in curved or bent beams, c590
Sherman, C. W. Bending cast-iron pipe, 40
Shirley, H. G. Systematizing purchase of road materials and equipments, 410
Slater, W. A. Determination of moments in continuous beams, *70
  Test of reinforced-concrete slabs, 155
Slater, W. A., and H. F. Moore. Use of the strain gage in testing materials, *132
Smith, W. P. Cracking of bronzes and brasses, 528
Sohier, W. D. Lessons from the International Road Congress, 405
Soper, G. A. Rational basis for sanitation of rivers and harbors, 294
Spackman, H. S. Analysis of cement test results by the autoclave method, 18
  Test for accuracy of cement sieves, c446
Spear, W. E. The city tunnel and conduits of the Catskill aqueduct, 333
Sperry, W. A. Water softening and decolorization, 294
Stanfield, A. C. Waterworks extensions at Pana, Ill., *96
Steinmetz, C. P. Ozone as room disinfectant, 645
  Value of the classics in modern education, 158
Stevens, E. A. Analysis of traffic stresses, 432
  Problems of road administration, 673
  Treatment of wornout and raveled macadam surfaces, 409
Stevenson, W. L. Sewage disinfection in Philadelphia, *256
Stingel, Edward. Novel bridge repair job, *53
  Reinforcing a scoured pier foundation, *182
Stokes, Wilfrid. Raising the Assuan dam, c112
Stover, F. H. Micro-organism troubles and mechanical filters, 100
Strack, J. W. Viaduct floor of hollow concrete tile, c733
Streeter, H. W. Mechanical filtration plant at Clarksburg, W. Va., *7
Sweetser, E. O. Moving loads on steel bridges, 663

T

Taft, J. R. Troy Union station depressed concourse, *691
Terrell, R. C. Treatment of wornout macadam surfaces, 410
Thomas, J. B., and E. A. Sandman. 20 and 37 degree plate counts for bacteria, 295
Thompson, S. E. Test for accuracy of cement sieves, c446
Thomson, T. K. A really Greater New York, c*167
Tower, M. L. Rebuilding Humboldt Bay jetties, 464
Tucker, H. F. Code of ethics of the Pacific Northwest Society of Engineers, c195
Tufts, Leonard. Sand-clay maintenance in North Carolina and South Carolina, 627

V

Van Auken, C. L. Maps and profiles for Federal valuation of railroads, c364
Van Auken, K. L. False economy in engineering construction, c280
Van de Greyn, E. B. The sinking of Imhoff tanks as open caissons, *432
Van Vleck, A. N. Utility vs. beauty, c84
Vogleson, J. A. Mortality rates of Philadelphia in relation to water supply, 290
von Recklinghausen, M. Sterilizing water with ultra-violet rays, *121
Voshell, J. T. Experiments in brick road construction, *347

W

Wason, L. C. Problems of the contractor, 693
Weaver, F. A. Creosoted wood blocks for factory and warehouse floors, 185
Wellton, O. G. Stress analysis of circular tubes, c674
West, F. D. Operation of Torresdale filter plant at Philadelphia, 290
Whinery, S. Progress in street cleaning, 295
Whipple, G. C. Decarbonation of public water supplies to remove corrosive properties, 213
  English test for desolved oxygen, 453
White, F. G. Port improvements at San Francisco, *49
Wig, R. J. Value of the autoclave test of cement, 16
Williams, A. D. Chimney struck by lightning, c*25
Wolcott, G. W. Method of checking economical height of office building, c111
Wolf, A. M. Principles versus practice in the teaching of engineering, c447
Wood, F. J. (See Owens, J. S.)
Wright, J. B. Ratings for valuation engineers, c705
Wynne-Roberts, R. O. Proposed Canadian Institution of Municipal Engineers, c251
  Tor Hill reservoir at Regina, Can., *267

*Illustrated articles; c, correspondence.